THE

AMERICAN REVIEW OF TUBERCULOSIS
ABSTRACTS OF TUBERCULOSIS

VOLUME XXXII NOVEMBER, 1935 ABST. NO. 3

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Leucocyte Counts in Diagnosis, Activity and Prognosis.—There is often considerable divergence of opinion on what constitutes activity in tuberculous lesions. Ordway refers to a study by Fellows covering 13,000 employees at the Home Office of the Metropolitan Life Insurance Company over a period of six years, in New York City. About 55 per cent were young men and women not more than twenty-five years of age; and, beginning in 1928, a routine fluoroscopic examination was added to the annual physical examination, with stereoscopic films added when specially indicated. This study indicated that we must look for tuberculosis before symptomatology is present and usually before physical signs appear. The great importance of a positive sputum in prognosis is again emphasized by the occurrence of 33⅓ times the expected mortality in patients at Mount McGregor with a positive sputum while under observation, a little over 3 times the expected when the sputum became negative and a little over 1½ times when persistently negative. That roentgenographic is much superior to stethoscopic evidence in detecting lesions is indicated by studies at Trudeau Sanatorium and at Saranac Lake. With very advanced and multiple lesions, however, limitations become evident. Crawford, to simplify the results of Medlar's studies on the leucocytes, has devised a slide rule by which a single figure index is obtained, under 15 indicating a favorable pathological state, and over 25 very unfavorable. A study of 281 patients over a six-year period showed no deaths among the group with favorable counts and 90 per cent working, as opposed to 42 per cent dead and 31 per cent working in the very unfavorable group. The disparities of opinion are manifest chiefly in the unfavorable groups in which Medlar contends that work is not a valid test. The sedimentation test is apt to conform rather snugly to clinical impressions of activity and in the early stages is definitely less valuable than serial roentgenograms. The X-ray must be relied on almost exclusively to diagnose small rather acute lesions developing especially in young adults. It is also of most value in determining activity while under observation and treatment. Signs and symptoms are rated last, but all available methods should be used in so complex a disease as tuberculosis.—*Discussion and Summary of the Whole Problem with Especial Reference to the Study of the Leukocyte Count in Pulmonary Tuberculosis, W. H. Ordway, New England J. M., August 9, 1934, ccxi, 260.*—(*A. P.*)

Leucocytes in Tuberculosis.—In a series of 111 cases of pulmonary tuberculosis, repeated leucocyte counts were made to determine the value of the filament-nonfilament count in detecting activity of the dis-

ease and perhaps the prognosis. Attention was also paid to the total and differential counts as well. Medlar's standards, slightly modified, were used as a working basis for the interpretation of the differential counts and 960, or 16 per cent, was considered the upper limits of normal for the nonfilament count. The haemocytological data thus obtained were correlated with other clinical and laboratory findings, such as the roentgen film, symptomatic activity, and the presence or absence of tubercle bacilli in the sputum and coarse râles in the lungs. The nonfilament count showed a close agreement (approximately 90 per cent) with the Medlar septic count and was correlated with the roentgen-ray diagnosis as interpreted in a special way. This interpretation, in addition to classifying the pulmonary lesion as active or inactive, determines whether the process is predominantly exudative or proliferative. In the active exudative group there were 45 cases, 36 (80 per cent) of which had at least 3, and 45 (88 per cent) at least one nonfilament count above 960 cells per cmm. In the active proliferative and inactive exudative groups there were only 12 cases which were quite evenly distributed and therefore did not compare in any definite fashion with the nonfilament count. In the inactive proliferative, or most favorable group, there were 54 cases. Of these 45 (83.3 per cent) had at least 3 nonfilament counts below 960 cells. The nonfilament count is apparently as reliable as any method of blood counting in determining the activity of tuberculous infections. When the nonfilament cells exceed 960, or 16 per cent, they are nearly always an indication of sepsis. Repeated counts are valuable in detecting relapses at their earliest stages. It is interesting to note that the Arneth count, of which the above is a simplification, was introduced by Arneth 30 years ago.—*The Leucocyte Picture of the Blood in Cases of Pulmonary Tuberculosis, with a Special Study of the Filament-Nonfilament Count, W. O. Kelley, Bull. Johns Hopkins Hosp., September, 1934, lv, 171.*—(*J. S. W.*)

Leucocytes in Tuberculosis.—Recent knowledge of the value of the leucocyte count in tuberculosis has come mainly from the studies of Medlar, and Cunningham and Sabin and their associates, the former demonstrating the value of this count in showing the status of the lesion and the latter emphasizing the monocyte, especially the monocyte-lymphocyte ratio, and its clinical import. According to Medlar the monocyte is concerned with the formation of the tubercle and repair of a tuberculous lesion after caseation, while the neutrophile takes an active rôle in the formation of abscesses and continues to do so as long as cavities and ulcers form or enlarge. Healing is characterized by the predominance of the lymphocyte. The process in the disease is reflected in the peripheral blood. Thus, more than 700 monocytes per cmm. indicates new tubercle-formation, more than 5,000 neutrophiles per cmm. suggests abscess-formation or the spread of an ulcerative process, and 2,000 or more lymphocytes per cmm. means healing of the process. Others have confirmed Medlar's work, which is reasonable in view of leucocyte counts used in other infectious diseases. Though the leucocyte counts are not as high as in acute infections, large groups of tuberculous patients show moderate elevations consistently, and the differential counts frequently are septic in type. Generally speaking, as long as the tuberculous infection is active, the leucocyte count is elevated and septic in character. As an example, over 70 per cent of 356 consecutive patients newly admitted to the Middlesex County Sanatorium had leucocyte counts above normal. The percentage of elevated counts increased with the degree of severity of the infection, the largest percentage, 93.6 per cent, occurring in the far-advanced C group. Very high leucocyte counts were limited almost entirely to the far-advanced B and C groups. Septic leucocyte pictures also predominated in the more active infections, but they were present in a large number of the minimal and moderately advanced cases. In the latter group there was a greater percentage of septic leucocyte pictures than of counts above 12,000. A group of patients who had frequent leucocyte counts studied by the author illustrated this relationship between the leucocyte picture and the activity of the disease. It was noted that the clinical and X-ray findings agreed closely with the laboratory findings. Experience demonstrated that when the former pointed to inactivity and the leucocyte count continued to be septic in type, the lesion should be regarded as still active. To illustrate this thesis leucocyte graphs are presented showing three types of reactions, the leucocyte picture in all closely coinciding with the clinical course. The conclusion is reached that the leucocyte count is of value in determining activity, especially the lower grades which might otherwise be regarded as inactive.—*The Leucocyte Picture as an Aid in the Measurement of Activity in Pulmonary Tuberculosis, J. Kaminsky, New England J. M., August 9, 1934, ccxi, 245.*—(*R. C. S.*)

Schilling Differential Count and Red-Cell Sedimentation.—Many theories have been advanced to account for a rapid sedi-

mentation rate, but none are universally accepted. However, it is more or less generally accepted that with an increase in protein catabolism there is an associated increase in the sedimentation rate. It is also known that the rate increases in anaemia and that there is possibly some relationship between the sedimentation rate and the amount of plasma fibrinogen. Of the many methods of determining this rate, that of Rourke and Ernstine is accurate, though in the absence of anaemia the method of Cutler is satisfactory. The sedimentation rate is an index of pathological activity and has been used extensively in the study of tuberculosis in which a normal sedimentation rate is rarely found in a clinically active case. It is felt to be of especial value in clinically inactive cases. Discharge cases having a rapid rate were found to do poorly by Trait. The sedimentation rate should be used in conjunction with the rest of the blood picture, including the Schilling count. Schilling states that *stab* or *band* cells increase first in infection and that more than 3 to 5 per cent means that a toxic element is present. Such a picture is regarded as one of a degenerative blood with a shift to the left. When the toxicity or infection is severe, overstimulating the marrow, there is an increase in juvenile or immature forms. When this is the case the blood picture is regarded as regenerative in type. Since a shift to the left is present in clinically active cases according to available literature, one can reasonably expect it also to be present before and after clinical symptoms are present. Duffy found that such a shift usually preceded trouble in a tuberculous patient. The author presents a study carried on with 35 female patients 17 to 35 years of age on whom white blood counts, differential counts, Schilling counts and sedimentation rates were done at two week intervals. Frequent clinical check-ups were done. The findings agreed with the previous statements. Even in cases not clinically active the blood findings were above normal. Ten minimal cases, clinically inactive during hospitalization, had blood findings above normal. By doing frequent blood check-ups, it was found that the results obtained over a period of time give a curve indicating that pathological state which checks closely with the patient's clinical condition. The sedimentation rate should be studied with the whole cellular blood picture for true information as to the patient's condition. Frequently performed sedimentation rates would probably indicate the true pathological status, for in cases followed over a long period the sedimentation rate and total white blood count were normal long before there was a normal Schilling count. An increase in the sedimentation rate occurs when pneumothorax is started and decreases according to the degree of successful collapse obtained. In deciding when exercise should be started or when the patient may be discharged, a serial blood picture is of real value, especially sedimentation rates and Schilling counts. Any patients, clinically inactive with blood values decidedly above normal should be carefully watched. These tests are also of value as an aid in diagnosing clinically inactive cases.—*Schilling Differential Count and Red Cell Sedimentation Rate as a Measurement of Activity in Pulmonary Tuberculosis, J. W. Cass, Jr. & Margaret Sutermeister, New England J. M., August 9, 1934, ccxi, 252.*—(*R. C. S.*)

Sedimentation Rate in Pulmonary Tuberculosis.—The sedimentation rate was studied in relation to the clinical course and prognosis in 5,145 patients with pulmonary tuberculosis. A normal rate occurred in 85 per cent of patients with cirrhotic tuberculosis; in 68.3 per cent of patients with cirrhotic-productive tuberculosis; in 42.3 per cent of patients with a strictly productive tuberculosis; and in 47 per cent of patients with cirrhotic tuberculosis and cavities. Of all patients with positive sputum, 25 per cent had a normal rate, while 500 patients with cavities had a normal rate. Only in a small percentage of patients did the sedimentation rate return to normal during sanatorium treatment. In 600 patients the sedimentation rate was studied with regard to final prognosis. In this work the observation period was 2¼ years. Patients who had a sedimentation rate of more than 51 mm. in the first hour showed 75 per cent mortality during the observation period, patients with the rate of 31 to 50 mm. had a mortality of 41 per cent, those with a rate of 21 to 30 mm., 20 per cent, and those with a rate of 11 to 20 mm. a 16-per-cent mortality. Particularly in patients who underwent operative treatment, a return to normal sedimentation rate was indicative of an excellent prognosis. —*Über den Wert der Bestimmung der Blutkörperchensenkungsgeschwindigkeit für die Diagnosen- und Prognosenstellung bei der Lungentuberkulose, G. Thiele, Beitr. Klin. Tuberk., September, 1934, lxxxv, 302.*—(*M. P.*)

Bacillaemia in Tuberculous Animals.—To determine the presence of tubercle bacilli in the blood Strempel made 180 cultures from the heart blood of 24 tuberculous rabbits and 11 tuberculous guinea pigs. Five to 10 cc. of blood was obtained by cardiac puncture and mixed with 10 per cent

of sodium citrate. It was haemolyzed by the addition of 50 cc. of distilled water, centrifugated, washed with water, and the sediment planted on 2 tubes of Loewenstein's medium. The remaining sediment was then treated with sulphuric acid, washed and planted on 2 to 6 tubes of Loewenstein's medium. Strempel calls attention to a possible source of error in that the needle may become contaminated with tubercle bacilli by passing through a tuberculous pulmonary lesion while being introduced into the heart. In one experiment 7 rabbits were injected intravenously with different strains of the human type tubercle bacillus while 3 rabbits were injected in a similar manner with different strains of the bovine type of bacillus. Cultures were made from the heart's blood at weekly intervals for the first 12 weeks and at longer intervals thereafter. From the blood of these infected animals cultures of tubercle bacilli were obtained regularly within the first 2 weeks after infection and at irregular intervals at from 3 to 33 weeks. The presence of tubercle bacilli in the blood-stream was not correlated with the extent or progress of the disease. Colonies of tubercle bacilli appeared within 22 to 27 days in cultures of the blood aspirated within the first 4 weeks after infection, while from blood obtained from 6 to 11 weeks after infection colonies were first observed 40 days after planting. In 1 of 6 rabbits infected subcutaneously with the human tubercle bacillus the organism was recovered from the heart 35 weeks after infection, while in 3 of 6 rabbits inoculated in the same manner with the bovine type the blood cultures were positive within the first week after infection and shortly before death. Cultures of tubercle bacilli were demonstrated in the blood in but 1 of 11 guinea pigs inoculated subcutaneously 2 to 5 months previously with tuberculous material. Strempel believes that bacillaemia may be induced by nonspecific irritation such as profuse bleeding and also occurs shortly before death. He states that the so-called "microscopic positive" blood culture of Löwenstein may in some instances be due to crystals of dye, and should therefore be confirmed by animal inoculation and by transplantation to suitable culture media.—*Ueber Tuberkelbazillämie bei Versuchstieren, W. Strempel, Zentral. f. Bakt., Orig., January, 1935, cxxx, 159.*—(*J. D. A.*)

Serum Coagulation Reaction in Pulmonary Tuberculosis.—The results obtained by the Weltmann reaction (*Med. Klinik 1930, 240*), show that in cases of productive fibrous tuberculosis there is a shift to the right. In cases of secondary infections complicating tuberculosis, in progressive cavitation, in exudative forms and in cases with caseous pneumonia, there is almost always a shift to the left. Differentiation between exudative and productive forms cannot be determined in all cases by the means of the coagulation test. In pleural effusion the coagulation band shows fairly exactly the course of the disease. In many cases it is advisable to combine the Weltmann reaction with the sedimentation test.—*Untersuchungen über die Serumkoagulationsreaktion von Weltmann bei Lungentuberkulose, Voigtländer, Klin. Wchnschr., December 1, 1934, xiii, 1718.*—(*F. G. K.*)

Vital Capacity and Alveolar Carbon-Dioxide Tension in Pulmonary Tuberculosis.—The alveolar carbon-dioxide tension indicates the state of the oxidative metabolism as far as the electrolytic factors and the concentration of ions in the blood are influenced by chemical changes which cause haematosis. The maximum voluntary apnoeic phase is closely connected with the efficiency of the gaseous exchange, which affords the establishment of the relation between extent and character of the tuberculous lesions and the respiratory function. In patients with artificial pneumothorax in sanatorium or ambulatory care there is a persisting decrease of the vital capacity, but there is no definite deviation from normal of the alveolar carbon-dioxide tension in the stage of eupnoea. The respiratory dynamics depend upon the degree of the impaired pulmonary ventilation. The period of voluntary apnoea is always decreased. The alveolar tension during maximum apnoea shows no relation to the apnoeic period. The average of the differential alveolar tension is below normal in all these patients. The proportion of gaseous amount and vital capacity (the coefficient of Strohl) shows no correlation between the duration of the apnoeic phase and the differential alveolar tension. This coefficient parallels the physical and physiological state of the respiratory tract and makes it possible to determine the severity of the disease as compared with the extent of the impaired respiratory surface.—*Die Vitalkapazität und die alveolaere Kohlensäurespannung bei der Lungentuberkulose, A. Risi, Ztschr. Tuberk., February, 1935, lxxii, 161.*—(*F. G. K.*)

Symptoms in Active Tuberculosis.—Symptoms can be used as an indication of activity of a tuberculous infection. Of the so-called constitutional symptoms the first to decrease are weakness, sweating, loss of weight and appetite usually, but continued predominance of these suggest an exudative

lesion. Fatigue generally persists in desperate cases, and failure to gain weight with bed-rest is also indicative of poor resistance. Persistence of a sustained afternoon temperature with morning remission suggests an active pneumonic type of infection with a poor prognosis, while continuance of an intermittent fever is of grave significance when present more than two months, and is generally accompanied by the above named symptoms in a marked degree. A decrease in activity is usually indicated by the fever becoming benign in character. If the temperature remains normal despite exercise the disease may be regarded as arrested or quiescent if other findings are also consistent with this. Aged patients may be an exception. Pulse and fever should be studied together. An unstable pulse, high in proportion to the fever present, characteristic of tuberculosis is an indication of activity, especially in an arrested case. Cough is not significant when occurring alone, but in a diagnosed case is probably a sign of activity and a cause for apprehension in an arrested case. Sputum is probably present along with cough earlier in the course of the disease than histories indicate. A positive sputum means the possibility of further spread. Haemoptysis must be considered a sign of progressive disease and should, unless proved otherwise, be treated as such so that needed rest is given and possible spread from it prevented. Pleurisy, usually a secondary infection, and occurring without constitutional symptoms, as a rule is not associated with a rapidly progressive infection, and its occurrence does not materially change the course of disease. It is concluded that constitutional symptoms may be used as a fairly accurate index of activity in the exudative type of disease, but in the proliferative type, when they may be absent, other methods must be used.—*Symptoms as a Measurement of Tuberculous Activity, H. S. Wagner, New England J. M., August 9, 1934, ccxi, 237.*—(*R. C. S.*)

Physical Signs in Active Tuberculosis.—The author presents several cases to substantiate his conclusions (1) that physical signs are often inadequate as a measure of activity and (2) may definitely be misleading except in base fluids when they are specific. Not infrequently physical signs indicate improvement in the condition of the patient and clearing of the original lesion, while an X-ray taken at the same time shows a new area of infiltration. The reverse may also be true. It should be remembered that non-tuberculous complications may be the real cause of the patient's condition. Physical signs, however, are of value in diagnosis and more attention should be paid to them.—*Physical Signs as a Measure of Activity in Pulmonary Tuberculosis, F. M. Hunt, New England J. M., August 9, 1934, ccxi, 239.*—(*R. C. S.*)

Nature of Breath-Sounds in Region of Cavities.—By oscillographical methods the author found that the power and the character of the transmission of the reverberation of the sounds in the region of pulmonary cavities depend on the degree of anatomical changes in the intervening tissue and the nature of the cavity-wall. True bronchial sounds are heard only in cases in which the region extending from the hilum to the chest-wall including the cavity area presents densities, infiltrates or fibrous tissue as a pulmonary and pleural indurative scar. In this case the bronchial breathing may disappear when the afferent bronchus is obstructed.—*Ueber das Verhalten des Atemgeräusches im Bereiche von Kavernen, R. Cobert, Klin. Wchnschr., October, 1934, xiii, 1429.*—(*F. G. K.*)

Head's Zones in Pulmonary Tuberculosis.—Head's zones of impaired sensitivity can be demonstrated in patients with pulmonary tuberculosis. They are not dependent on the extent and localization of the pulmonary process, with the exception that they are always found on the same side with the pulmonary lesion. The qualitative nature of the pulmonary lesions does not markedly influence the development of Head's zones, although they are more pronounced in exudative processes. However, the zones of impaired sensitivity are present only in active lesions, but they may be absent. The presence of Head's zones may be considered a definite sign of activity.—*Headsche Zonen bei Lungentuberkulose, Marie v. Barbarczy, Beitr. Klin. Tuberk., January, 1935, lxxxvi, 33.*—(*M. P.*)

Treatment of Haemoptysis.—When the site of bleeding is not accessible to the ordinary methods of haemostasis the practitioner feels more or less helpless, while the psychological effect on the patient is unfavorable. Preparations recommended to promote clotting are mostly unreliable. Mental and physical rest and quiet are of more importance, but their action is only gradual. Inhibition of the cough reflex, as by considerable doses of morphine, entails the dangers of aspiration, plugging of bronchi, dissemination of infection. Likewise, it is a mistake to order the patient not to cough. For the past two years Morlock and Pinchin have used an intravenous solution of congo-red as a haemostatic, first recommended by

Becker and others in 1930. Its effects on clotting time have been proved in rabbits, and Becker attributes them to increase in monocytes, blood platelets, and blood-fibrin. The adult dose is 10 cc. of a 1 per cent solution. This may be followed by a rigor of short duration. Repetition in four to six hours may be advisable. In only two instances has the bleeding failed to be controlled. Artificial pneumothorax is, of course, always to be considered, if one can determine the side from which bleeding is occurring, and in a few cases phrenic nerve operation.—*Haemoptysis: a note on Pathology and Treatment, H. V. Morlock & A. J. S. Pinchin, Brit. M. J., October 27, 1934, no. 3,851, 762.—(A. P.)*

Uveo-Parotid Tuberculosis.—The association of inflammatory lesions of the uveal tract and of the parotid gland was first recorded by Heerfordt 24 years ago. Most of the patients were in the second and third decade of life with a slight preponderance of females. Parotitis is constant, usually bilateral, and subsides in a period varying from days to months. Uveitis is a constant finding and generally in the form of iridocyclitis, often with nodules in the iris recognizable as tubercles. A transient facial palsy is present in half the cases. The condition pursues a chronic course, with a marked tendency to spontaneous recovery, the mortality being about 5 per cent. Mumps, syphilis, leukaemia and tuberculosis have been considered as the aetiological factor, but the authors consider tuberculosis as the sole cause. Microscopically, the tuberculosis is of a peculiarly fibrosing and noncaseating type in which tubercle bacilli are very scanty and difficult to demonstrate. Two cases are reported.—*Uveo-Parotid Tuberculosis, H. G. Garland & J. G. Thomson, Lancet, October 6, 1934, ccxxvii, 743.—(B. T. McM.)*

Uveo-Parotitis.—A case is reported of uveo-parotitis occurring in a man, aged 27. In the discussion the tuberculous aetiology is questioned. Garland and Thomson's evidence in favor of a tuberculosis origin is (1) postmortem findings of miliary tubercles and tuberculous deposits in the heart, as reported by four observers; (2) biopsies with histological evidence of tuberculosis in (a) iris, 4 observers, (b) bulba conjunctiva, one observer, (c) parotid, 5 observers; (3) iris nodules, 5 observers, (4) focal reaction to tuberculin, 2 observers, (5) tuberculosis of lung with positive sputum, one observer. "That is to say," in their opinion, "in more than one-third of recorded cases we have incontrovertible evidence of tuberculous infection." There are certain facts, however, which are difficult to reconcile with this hypothesis: *1: Pathological:* The tubercle bacillus has never been demonstrated in histological sections prepared from the iris, parotid or lymphatic nodes. *2: Eye condition:* Except in cases in which nodules were found in the iris characteristic of tubercle, syphilis, or leprosy (the last two having been said to be excluded), the course of the eye lesion is not characteristic of tuberculous disease of the eye. *3: Nervous lesions:* The neurotic manifestations appear to be produced by some circulating toxin, which is not a feature of tuberculosis. In view of these conflicting facts the designation uveo-parotid tuberculosis is at this stage unjustified.—*Uveo-Parotitis, C. B. V. Tait, Lancet, October 6, 1934, ccxxvii, 748.—(B. T. McM.)*

Uveo-Parotitis Polyneuritica.—Uveoparotitis polyneuritica is an uncommon syndrome characterized by inflammatory lesions of the uveal tract of the eye, enlargement of the parotid glands, facial palsy, commonly unilateral but occasionally bilateral, and fever. A case is reported of a young girl with prodromal skin rash, iridocyclitis, bilateral parotitis and unilateral facial palsy, both subsiding spontaneously, and evidence of peripheral neuritis. At first it was impossible to determine the cause of the iridocyclitis, but the subsequent progression to a typical tuberculous iridocyclitis strongly supports the suggestion that the syndrome is tuberculous in origin.—*Uveo-Parotitis Polyneuritica. Report of a Case, T. A. L. Davies, Lancet, October 6, 1934, ccxxvii, 746.—(B. T. McM.)*

Mikulicz Syndrome and Tuberculosis.—A case of Mikulicz syndrome is reported which clinically appears to be of tuberculous aetiology, and which, it is suggested, may be classified as a case of uveoparotid tuberculosis. Certain unusual features are the site of the uveal lesion and the presence of an associated skin condition. The suggestion that the tuberculous infection in these cases is of benign type is supported by the progress noted in the case.—*Mikulicz Syndrome in Association with Tuberculosis. Report of a Case, W. E. Rees, Lancet, October 6, 1934, ccxxvii, 749.—(B. T. McM.)*

Haematogenous Laryngeal Tuberculosis.—Laryngeal tuberculosis originates, in the majority of cases, by contact infection from sputum. In cases of haematogenous pulmonary tuberculosis, the laryngeal lesions are often of haematogenous origin. An analysis of 72 tuberculous larynges associated with haematogenous pulmonary tuberculosis

revealed the following peculiarities: Most frequently the regions of the entrance to the larynx are involved, that is, the epiglottis, arytenoepiglottic folds and false vocal-cords. With a chronic course, marked swelling and reddening occur with relatively little subjective symptomatology. In more acute developments, ulcerations form. If the lesions spread to the upper part of the epiglottis, to the paralaryngeal regions or to the soft palate, uvula and the tonsils, the prognosis is unfavorable. While the first affection is a part of a haematogenous propagation, the local development depends on the activity of the lesions produced by the spread and on the question whether repeated disseminations occur or not. In other words, the laryngeal development is closely dependent on the state of the general infection. The disease is much more frequent in men than in women. In about two-thirds of the cases the disease is fatal. Complete cures are rare, while marked and lasting improvements frequently follow local treatment after the subsidence of the haematogenous spread.—*Hämatogene Kehlhkoftuberkulose, K. Menzel, Beitr. Klin. Tuberk., September, 1934, lxxxv, 281.—(M. P.)*

Roentgenological Diagnosis of Laryngeal Tuberculosis.—It is emphasized that a simple X-ray picture of the larynx may be a material help in diagnosis of laryngeal tuberculosis, particularly in cases in which the epiglottis is so much thickened as to interfere with proper laryngoscopic examination.—*Röntgendiagnostik der Kehlkopftuberkulose, Beitr. Klin. Tuberk., December, 1934, lxxxv, 556.—(M. P.)*

Tuberculosis of Major Bronchi.—Tuberculosis of the major bronchi not infrequently leads to bronchiectasis. The rigidity and size of the diseased bronchi may impede collapse of the lung and interfere with the natural healing of cavities. The term "major bronchi" refers to air-passages that possess mucosa, submucosa, muscle, elastica, mucous glands, an encircling wall of cartilage and a definite adventitia. The material studied consisted of 37 routine unselected cases of pulmonary tuberculosis, mostly chronic phthisis, but also cases of childhood tuberculosis and of miliary tuberculosis. Tuberculosis of the major bronchi can be classified according to pathogenesis as (1) infection by implantation, (2) infection by contiguity, and (3) infection by continuity. The first is decidedly less common than the other two, a fact that may be ascribed to the protective influences of cilia, mucus and bronchial peristalsis. Infection by contiguity is prone to occur because of the proximity of the extracartilaginous mucous glands to diseased lymphatics and lymph nodes. The tendency for the disease to affect the mucous glands is striking. The process is definitely between the acini of the gland. The latter are pressed aside, either undergoing atrophy or, owing to the obstruction of their ducts, becoming dilated. The infection does not proceed from the bronchial lumen by way of the collecting tubules of the mucous glands. Proliferation of the adventitia and atrophy of the mucous glands tends to close this avenue (2) of infection. Infection by continuity occurs secondarily to an implantation of tuberculosis in the lower lobes and in the bronchi draining a tuberculous cavity. The mucous glands are not selectively chosen for attack; the pathological process infiltrates all tissues. Major bronchi appear to be especially resistant to tuberculosis; when fibrosis, however, has transformed them into rigid tubes, and mucosa and submucosa are destroyed and replaced by tuberculous granulation tissue, an open focus of disease is created which is rarely closed either by natural processes of healing or by pneumothorax or thoracoplasty. It is suggested that the critical aspect of a tuberculous cavity is not so much its size *per se* or the density of its wall, as its relation to a major bronchus.—*Tuberculosis of the Major Bronchi, H. S. Reichle & T. T. Frost, Am. J. Path., September, 1934, x, 651.—(J. S. W.)*

Incidence of Intestinal Tuberculosis.—One thousand consecutive autopsies at the Philadelphia General Hospital were analyzed to show the incidence of intestinal tuberculosis and its relation to pulmonary tuberculosis. Ulcerative intestinal tuberculosis was shown to have its highest incidence in cases of fibroulcerative cavernous pulmonary tuberculosis. It was present in 59 instances, or 56 per cent, of the 105 cases of fibroulcerative cavernous tuberculosis in the entire group of 226 cases of pulmonary tuberculosis. It was so confined to this group that one might suspect that there is no intestinal ulceration without pulmonary ulceration. It also occurred in cases of early or exudative pulmonary tuberculosis, in which, however, it had its lowest incidence (18 per cent). It occurred more frequently in women of the Negro race between 20 and 40 years of age. It was not observed in any case of chronic fibroid or miliary tuberculosis. Primary hyperplastic tuberculosis or tuberculoma of the bowel was not observed in any case.—*Intestinal Tuberculosis: Pathologic and Roentgenologic Observations, R. S. Boles & J. Gershon-Cohen, Jour. Am. Ass., December 15, 1934, ciii, 1841.—(G. L. L.)*

Hip-Joint Tuberculosis.—The authors report the end-results of 170 unselected cases of hip-joint tuberculosis treated over 8 years by the hip-fusion method of Hibbs. Seven patients died within one year after operation, leaving 163 who had follow-up examinations of from one to eleven years inclusive. By primary operation, 112 cases, or 68.7 per cent, were fused; with secondary, and in some instances tertiary, procedures in forty-one cases, 142, or 87.2 per cent, were fused. Fusion through the transposed trochanter was followed by fusion through the diseased area, and gave an extremity that was stable and free from pain, and that could be relied on for unrestricted weight bearing. Thirteen deaths in all occurred, seven within a period of one year after operation and six afterward. The chief factors influencing fusion were found to be (1) faulty operative technic, and (2) adequate immobilization by replacing a probably poorly fitting plaster by a snugly fitting one within two weeks after operation. In 56 cases, or 34.2 per cent of the whole series, sinuses developed at some time after operation. This does not include 12 patients who had sinuses at the time of operation.—*Hip Joint Tuberculosis Treated by Fusion Operation: an End-Result Study of One Hundred and Seventy Unselected Cases, H. Hallock & J. W. Toumey, Jr., Jour. Am. Med. Ass., December 15, 1934, ciii, 1836.*—(*G. L. L.*)

Psoas Abscess with Cervical Pott's Disease.—It is not uncommon to see a psoas abscess resulting from a low dorsal or lumbar lesion emerge along the lower thigh or in the popliteal region. But to see a psoas abscess in the groin originating in the cervical spine is rare. The case reported is that of a female, aged 20, admitted to Lakeville (Massachusetts) State Sanatorium in November, 1933. There was a history of a left cervical sinus from the age of 3, draining continually the past six years. In October, 1933, roentgenograms at a hospital after lipiodol injection revealed the sinus tract extending into the mediastinum as far down as the diaphragm. Fusion of the cervical spine with osteoperiosteal grafts was performed in October, 1933, and on admission to Lakeville the sinus was still draining freely and the blood showed a definite leucocytosis. On January 13, 1934, the patient had an elevation of temperature to 101.4°F., followed by irregular fluctuations. On February 15 she complained of left crural pain just below the groin and there was flexion spasm of the upper thigh muscles. On March 15 abdominal examination revealed a firm mass in the left lower quadrant extending into the pelvis. X-rays of the lumbar spine were negative, also of the pelvis and abdomen except for a small lipiodol shadow at the level of the second lumbar vertebra. The sinus in the neck was then injected with lipiodol. Reproductions of the X-ray films are shown, illustrating the course of the medium on its way into the pelvis. In April a fluctuating mass protruded in the left groin and the leg was drawn up. There was marked elevation of temperature and leucocytosis. The abscess, after exploration, was incised and about 750 cc. of thick pus obtained. Following establishment of tube drainage the temperature dropped and the pain and spasm ceased. Bacteriological examination was negative. It is assumed that the sinus must have extended through the gaps between the crurae and traversed the psoas sheath, finding a basin in the pelvis where pus accumulated.—*Report of a Case of Psoas Abscess Resulting from Tuberculosis of the Cervical Spine, L. Alpert, New England J. M., October 11, 1934, ccxi, 675.*—(*A. P.*)

Renal Tuberculosis and Malignant Tumor.—To the 13 completely previously reported cases of associated renal tuberculosis and malignant tumor a fourteenth is added. Ten have been reported since 1925. The history, clinical, autoptic and microscopical findings are included in this report, together with summaries of the other cases. The case in point had healed pulmonary tuberculosis, healing right renal tuberculosis, right tuberculous epididymitis and a left hypernephroma which may have followed healing of a tuberculous lesion.—*Associated Renal Tuberculosis and Malignancy, M. R. Keen, Am. J. Surg., September, 1934, xxv, 467.*—(*J. F. B.*)

Tuberculous Meningitis.—With only a few exceptions, tuberculous meningitis develops as a complication of fresh primary tuberculosis. In those cases in which opportunity for observations was possible long before the onset of the meningitis, it was found that two-thirds of the cases developed the meningitis 4 to 6 weeks after the appearance of the first sign of tuberculous infection. It is also noteworthy that while the incidence of both primary tuberculosis and tuberculous meningitis is highest in the winter and spring months, there is a significant relationship between the peaks of incidence. In the case of tuberculous meningitis, these peaks appear, roughly, two months later than in primary tuberculosis. These observations emphasize the importance of early detection and early "prophylactic" treatment of primary tuberculous infections, particularly in infants, by prolonged bed-rest and hygienic measures,

preferably in sanatoria. The marked decline in the number of cases of tuberculous meningitis at the Gothenberg Hospital occurring in the first 3 years of life during the past 6 years is attributed to the intensive carrying out of such measures.—*Some Aspects of Tuberculous Meningitis and the Possibility of Its Prevention, A. Wallgren, Jour. Ped., September, 1934, v, 291.*—(*M. D.*)

Tuberculosis of Muscle.—A woman, 28 years of age, with history of tuberculosis of the right knee ten years ago and Pott's disease for years, was admitted to the hospital complaining of swelling behind the right knee for one year. There was little, if any, fever, the range of motion was 180°–120°, the skin was normal in appearance and freely moveable over the tense elliptical swelling which was about 10 cm. in length and located on the inner posterior aspect of the knee. On attempted aspiration the needle seemingly entered a cavity but no material was withdrawn. Injection of contrast medium did not give additional information and the roentgenogram revealed an entirely normal knee joint. At operation the disease process was found to be limited to the inner head of the gastrocnemius muscle. This was amputated and perfect healing resulted. The surgical specimen grossly consisted almost entirely of an irregularly roughened sac which contained caseous material. The histolopathological diagnosis was tuberculosis of the muscle. Arthroscopy at the time of operation was negative, but one done 25 days later revealed some chronic inflammation and biopsy specimens showed tuberculous synovitis. In view of the findings at and before operation and in spite of the biopsy specimens from the joint, this case is considered an infection of the muscle independent of the joint. Excision of the muscle is the treatment of choice. If the location makes this impossible, Bier's hyperaemia, aspiration and injection of the cavity with 10 per cent iodoform in glycerine, and roentgen-ray therapy should be used.—*So-called "Primary" Tuberculosis of Muscle, H. Milch, Am. J. Med. Sc., September, 1934, clxxxviii, 410.*—(*E. M. J.*)

Surgical Treatment of Pulmonary Tuberculosis.—All forms of collapse therapy have two basic principles: (1) reduction in size of the involved lung (collapse) and (2) diminution in its motion (rest). A reduction in its movements, such as in respiration, favors the natural process of healing and lessens the likelihood of spread of the disease. A reduction in size of the lung facilitates scar-tissue contraction and closure of cavities. Coincident with the obliteration of pulmonary cavities there is reduction or abolition of sputum. Cough disappears if collapse is adequate. Likewise tubercle bacilli disappear from the sputum. Why has closure of pulmonary cavities become the primary objective? Because, after a certain amount of pulmonary tissue is destroyed by the disease process, we have a thoracic cage out of proportion to the size of remaining lung tissue. Then, two things must happen as the scar contracts, that is (1) the remaining lung must expand to occupy the entire hemithorax, and (2) the boundaries of the hemithorax must move in to decrease the volume of the thoracic cage. Nature assists by crowding the ribs closer together, displacing the diaphragm upward, and shifting the mediastinum toward the affected side. If there remains a discrepancy between lung and thoracic size, cavitation persists. In such cases surgery presents further help of a mechanical nature. The permanent collapse procedures move in the walls of the hemithorax and reduce the size of the chest proportionately, so that the lung may completely fill it. For a time collapse therapy was limited to patients with unilateral disease and emphasis was placed on complete collapse of the diseased lung. Recently attention has been focused on a selective type of collapse, permitting functioning of healthy portions of the lung. Collapse procedures may be divided into two groups, (1) temporary and (2) permanent. Some form of temporary collapse is indicated, in general, in (1) all acute or actively progressive forms of disease and (2) chronic cases with minimal destruction and probability of reëxpansion after healing. Permanent collapse is generally required in all chronic forms of disease when lung destruction leaves a gap between the size of the lung and that of the chest. Temporary forms of collapse are (1) pneumothorax and (2) temporary diaphragmatic paralysis produced by crushing the phrenic nerve. It is true that in most cases an attempt should be made to induce pneumothorax as the first procedure. However, there are many cases which, when first seen, have extensive involvement with marked fibrosis and cavitation. Here much time will be saved by considering permanent collapse without delay, as the lung can never reëxpand. Also, in cases of only partially successful pneumothorax, consideration should be given to other procedures permitting more satisfactory collapse of the diseased apex together with reëxpansion of the relatively good base. Pneumothorax is often continued too long with the lung collapsed in the wrong part. Then, if there is a complicating pleuritis or effusion, reëxpansion becomes unlikely and the basal part of

the lung is sacrificed. There are also cases in which pleural adhesions have interfered with effective collapse by pneumothorax. These adhesions can often be safely divided with a fine cautery manipulated through a cannula inserted through an intercostal space under direct vision of a thoracoscope. A complete division of adhesions will convert a partial into a complete pneumothorax, but the operation is not without danger because of the difficult nature of some adhesions and possibility of injury to the lung itself and infection of the pleura; hence its use should be limited to those skilled in thoracoscopic work. Haemorrhage in a field out of control is also to be considered. For selected cases the method may be life-saving and is a valuable adjunct to pneumothorax therapy. When the adhesions are very complicated, a permanent collapse procedure is preferable. Hemidiaphragmatic paralysis by phrenic-nerve crushing causes cessation of movement of the diaphragm and elevation. The effect of the temporary paralysis lasts six to twelve months or until the nerve fibres grow down to the diaphragmatic muscle from the point of crushing. If it does not produce the desired effect within this time paralysis can be made permanent or some other method of collapse resorted to. Temporary phrenic nerve paralysis is indicated in (1) minimal lesions, predominantly unilateral; (2) acute or progressive unilateral lesions (predominantly) when pneumothorax fails; (3) cases with basal involvement; (4) to check pulmonary haemorrhage, pneumothorax failing; (5) as an adjunct to inadequate pneumothorax when closed pneumolysis seems impracticable; (6) to prepare a patient for thoracoplasty when he is not yet a good risk, but, when the upper lobe only is to be collapsed, diaphragmatic function is to be preserved; and (7) in some hopeless cases for symptomatic relief (cough and expectoration). *Indications for thoracoplasty:* (1) Cases with unilateral cavitation, fibrotic and preferably stationary; (2) complicated pneumothorax cases (a) uncollapsed cavities, (b) persistent adhesions, pneumolysis impracticable, (c) exudate or tuberculous empyema interfering with pneumothorax continuation; and (3) cases of bilateral apical involvement in fair general condition (a) with sufficient healthy lung at base and vital capacity at least 1,500 cc., (b) when closure of the cavity on both sides seems possible. A follow-up of 81 thoracoplasty cases, over half of which had bilateral disease and 15 bilateral cavitation, showed none made worse, 13 about stationary, and 53 improved. The first 48 were analyzed in detail and showed satisfactory collapse of the diseased area in 46, sputum negative in 44. Benefit was noted in 90 per cent. *Extrapleural pneumolysis and plombage:* Extrapleural separation of the dome of the lung and insertion of a paraffin pack beneath the ribs has a definite but limited usefulness. It has the advantage of not disturbing the thoracic cage and the intact ribs support the pack. There is little shock. Indications are (1) bilateral disease too extensive for upper thoracoplasty, (2) Preliminary to thoracoplasty in doubtful risks, and (3) adjunct to other procedures in bilateral disease. *Selection of procedures:* It is a mistake always to begin with pneumothorax, then try a phrenic operation, and, after years of bed-rest, thoracoplasty. That form of collapse should be done which will most certainly and completely close in the involved areas and leave the most functioning lung. The method of invariable sequence should be discarded. Also, surgical treatment does not supplant bed-rest and other general measures. After convalescence from operation from six to twelve months are required for satisfactory healing.—*Why Surgical Operations Benefit Patients with Pulmonary Tuberculosis, R. H. Overholt, New England J. M., October 11, 1934, ccxi, 682.*—(*A. P.*)

Nonoperative versus Operative Treatment.—The treatment of tuberculosis cannot be discussed from a purely scientific standpoint, but must include its psychological, social, domestic and economical aspects. Adequate treatment for the early lesions is most important, since these are most easily cured and the patient left in a satisfactory condition. In the natural healing of tuberculosis reliance is placed on the patient's own bodily reactions. This protective mechanism varies, but is always slow. A well-balanced physiological state brought about by rest is sufficient to produce cure in nearly every case in which healing depends alone upon the resistance of the patient. The curability of tuberculosis depends upon whether a lesion is predominantly proliferative or predominantly exudative, as well as upon its extent, age and activity. The predominantly productive lesion extends in spite of its mildness and sooner or later becomes a combination of proliferative, exudative and often destructive processes; it is more difficult to heal than an exudative lesion of similar extent and leaves an extensive scar as compared with the minimum scar in exudative lesions. The predominantly exudative lesion extends more precipitately and results in a greater toxicity and a more efficient immunity. The factors which separate the cases into nonoperative and operative groups are largely of a mechanical nature

and interfere with compensation. They are pleural adhesions and fixation of the diaphragm, widespread fibrosis, the emphysema which developed prior to the time of the destructive lesion, and rigid thorax. From the purely scientific standpoint of curability alone, tuberculosis may be divided into eight types. The following will heal fairly regularly without operative assistance: *1:* Early limited lesions of either proliferative or exudative type. *2:* More extensive proliferative lesions involving one or both lungs provided they have not taken on extensive metastasis and destructive processes with multiple cavitation. *3:* More extensive exudative lesions with or without cavity, provided the noninfected lung tissue can make the necessary mechanical adjustments. *4:* Exudative lesions which are accompanied by extensive atelectasis will usually heal, even though they may be accompanied by fever which lasts several months. As the disease advances the following types cannot be depended upon to heal without operative aid. *5:* Comparatively small lesions with a cavity which is held open by pleural adhesions and is prevented from closing because the unaffected lung tissue is unable to make the necessary compensatory changes, such as apical or subapical cavities covered by a pleural cap and especially when the upper mediastinum is fixed. *6:* Any active lesion continuing to form metastases unduly long in spite of a carefully followed nonoperative treatment. *7:* Lesions in which a destructive process is seriously threatening cavity-formation. *8:* Any lesion which is prevented from healing by mechanical hindrances. In actual practice however, not only groups 5, 6, 7 and 8 are given operative treatment; but some of group 1, many of groups 2 and 3, and practically all of group 4 are usually treated by pneumothorax or phrenicectomy or both.—*Non-operative Versus Operative Measures in the Treatment of Pulmonary Tuberculosis, P. M. Pottenger, Am. J. Med. Sc., August, 1934, clxxxviii, 169.*—(*E. M. J.*)

Extrapleural Compression in Treatment.—Plombage was used in 22 cases in which previous procedures showed no improvement in a progressive tuberculosis. A mixture of paraffin and vioform or boric acid is recommended. The amount of the filling substance should never excede the space of the defect as produced by the resected rib and one should avoid to exert pressure. The use of a rubber bag filled with paraffin or "vivocoll" in 3 cases caused severe irritation, in one of which a fatal haemorrhage of the subclavian artery occurred. The mixture of paraffin and "granugenol" proved also unsuccessful, for the filling was evacuated spontaneously soon after the operation. In 6 more cases the results were poor and the disease showed no improvement. Of the 22 cases only ten were cured. The extrapleural compression should only be used to supplement thoracoplasty; it is not comparable to pneumothorax and phrenic paralysis. The chance of avoiding larger costal defects in cases of small cavities or the impossibility to perform a thoracoplasty present the ideal indications. There is as yet no filling substance superior to paraffin.—*Die Plombenbehandlung der Lungentuberkulose, H. Scholz, Tuberkulose, January 10, 1935, xv, 5.*—(*F. G. K.*)

Roentgenkymography and Collapse Therapy in Pulmonary Tuberculosis.—X-ray kymography of the respiration allows the diagnosis of pleural densities. On analysis of the kymograms four cardinal symptoms may be observed: *1:* Density of the pleura in the lateral sinus causes marked obtuseness of the costodiaphragmatic angles. *2:* Density of the costal pleura produces a decrease in movement of the lung in respect to the diaphragm and the bronchial tree as compared with the opposite side. *3:* Density of the parietal pleura increases the distance of the bronchial tree to the diaphragmatic border of the lung. *4:* Density of the main interlobar fissure is shown by an unusually wide excursion of the diaphragm. Partial, as distinguished from total, pleural density is made evident in the same manner. Pendulous motion of the central shadow due to a contraction of an entire lung may denote either particularly strong traction or a very mobile mediastinum suggesting greater risk of mediastinal flutter during plastic procedures. The diaphragmatic motion can cause movement of the upper lung regions, not only as a result of interlobar thickening but also owing to interlobar contraction. Traction due to scar-tissue affecting any particular part of the heart may cause disturbances which are purely mechanical in origin and not the result of myocardial disease. The present kymographical analysis may be of great value in regard to the various procedures in collapse therapy.—*Röntgenkymographie und Kollapstherapie bei Lungentuberkulose, G. v. d. Weth, Fortschr. a. d. Geb. d. Röntgenstrahlen, November, 1934, i, 5.*—(*F. G. K.*)

Forlanini's Original Communication on Artificial Pneumothorax.—*Foreword:* Carlo Forlanini, born in Italy in 1847, was graduated in medicine at 23, and appointed in 1870 to the staff of the Ospedale Maggiore of Milan, first in the Department of Chronic

Diseases, afterwards as Assistant Professor, acting as head physician in medicine, dermatology, obstetrics and pediatrics. In 1884 he assumed the chair of what corresponds to physical diagnosis in the University of Turin and in 1899 a similar one at Pavia, becoming Professor of Clinical Medicine there in 1900. His interest in tuberculosis was manifest in 1874 when he read the hospital staff a paper on "A case of Tuberculosis of the Myocardium with Large Nodes" and between 1874 and 1882 he published 9 more papers on phthisis, including in August, 1882, in the *Gazetta degli Ospedale e delle Cliniche di Milano* his long and epochal paper first suggesting artificial pneumothorax in the treatment of phthisis, on the basis of careful deduction from accurate clinical observations of himself and others. This was the same year that Koch discovered the tubercle bacillus. Forlanini reviews the literature back to 1698, which dealt mostly with the surgical drainage or injection of pulmonary cavities, remarking that "the pulmonary cavern is not the whole of the process of phthisis," and then starts to evaluate experiments on extirpation of the lung by Glück and Block, in Germany in 1881. He proceeds to discuss reports published in France by Toussaint, Herard, and Meusnier, on the occasionally favorable effects of a pneumothorax or pleural effusion developing in the course of phthisis, emphasizing the new mechanical conditions introduced, rather than accepting Toussaint's ready explanations. He emphasizes the anatomical and functional differences between the lungs and other viscera and how these are altered by pneumothorax. He takes up the question of intrapleural pressures and their regulation. Following this communication Forlanini went on testing his theory for twelve years, until in 1894 he was able to present to the 11th International Medical Congress in Rome his "First Attempts at Artificial Pneumothorax in Pulmonary Phthisis," published in the *Gazetta Medica Di Torino*, and followed very shortly by another paper read at the 6th Congress of Internal Medicine, at which he reported his first successful case. A minute description of his technique shows it not to have differed greatly from that of to-day, and he hopes that "in some special cases it can find a place in the present, large, varied but also ephemeral and deficient armamentarium against pulmonary phthisis." The case reported in 1895 was that of a girl of 17, with advanced cavity lesions on the right, who after less than a year, symptoms having disappeared, was able to work regularly as a housemaid, with refills of 250 to 300 cc. every six weeks. Forlanini's writings, which continued until 1912, were widely reported throughout the western world, except the United States. He died in May, 1918, at 71, and a Carlo Forlanini Foundation was organized in Italy for tuberculosis research, especially as to therapy. Lojacono points out that, while most methods of treatment proposed have with time lost prestige and the interest of the profession, that of Forlanini has constantly gained in consideration and paved the way to practically all modern surgical methods in treating pulmonary tuberculosis. Recently the Tomarkin Foundation held under the auspices of the Royal University of Milan (September, 1932) a 50th commemorative anniversary of the introduction of artificial pneumothorax by Forlanini and the discovery of the tubercle bacillus by Koch. Forlanini's papers seem particularly inspired and prophetic, hesitant in style, yet sure in conviction. *Abstracted Translation of Forlanini's Papers by Salvatore Lojacono: A Contribution to the Surgical Therapy of Phthisis. Ablation of the Lung? Artificial Pneumothorax? Gazetta degli Ospedale e delle Cliniche di Milano, year iii. August 23, 1882:* Forlanini relates reading recently a book by a recovered tuberculous physician, who had delved deeply into the literature, to find mostly a mass of notions, contradictions, exaggerations, and untruths, and compares it with his own state of mind. He finds that, whereas most holding the "monist" conception of tuberculosis have tended to revert toward a modified Laennec view, he himself is led to regard the rôle of the tubercle as merely secondary. In therapeutic practice, actually the clinician departs from the pathologist and bends his efforts to sustain by every means his patient's resistance. He lives from day to day. *September 13, 1882:* In October 1873 a German physician, W. Mosler of Greifswald, and in March, 1874, an American, Pepper, of Philadelphia, punctured the thoracic walls of pulmonary cavities in consumptives, using cannulas, and injected medicated solutions. The inception of this idea is stated by Pepper to date from Baglivi in 1696, and during the eighteenth and nineteenth centuries a number of English physicians opened the chest in various conditions. Then, in 1881, Fenger and Hollister, of Chicago, published 6 case histories bearing on the opening of the thoracic wall for pulmonary lesions, beginning with Radek's in 1878, including 2 of Powell and Lyell, of London, and ending with Fenger's own, apparently one of localized bronchiectatic lung abscess. To these are added by Forlanini 2 more cases, one by Ball, the other by Albert. *September 20, 1882:* Forlanini thus summarizes 17 cases, published over a period of 40 years, in America and Europe,

as constituting the experimental material of the surgical therapy of phthisis (although most of these dealt with other pathological conditions). He admits that nearly half were cases of abscess or gangrene and the operated cases of true pulmonary phthisis but 9,—those of Hastings, Storks, Hocken, Mosler's 3 and Pepper's 5 cases. As three were early interrupted by death, only 6 remain, of which one (Mosler's third) was followed by effective improvement, ended by amyloid degeneration and miliary dissemination, and 4 others (Pepper's last three and that of Hastings, Storks and Hocken) were notably successful, though not followed up very far. Forlanini emphasizes that "these surgical practices have no more value in the series of remedies, than the significance of the cavern has in the course of the process... while their harmlessness is sufficiently established to make them legitimate and desirable new experiments." *September 24, 1882:* Experiments on resection of portions of the lung or of total extirpation have been reported by Gluck, Marcus and Block in Berlin and Paris, the high mortality being due to untoward complications. Will such resection or ablation be the future therapy of phthisis? *September 27, 1882 & October 1, 1882:* The publication in 1880 and 1881 of 26 clinical histories in France, 26 by Toussaint, one by Herard, and one by Meusnier, collected with great pains by the first-named, including 2 on the service of Potain, have to do with the favorable effects of a spontaneously developing pneumothorax or exudate on the underlying pulmonary phthisis (in most cases). These are set forth in much detail, and at once suggest the question why one should not purposely cause in a consumptive an artificial pneumothorax through the chest-wall, with the necessary precautions to prevent secondary pleuritic processes. *October 8, 1882:* On going over the 9 case-history reports of the French authors that he considers most significant, Forlanini is convinced that the pneumothorax was the only and essential reason for the change in their clinical course. He, however, does not accept the interpretation offered by Toussaint and acceded to by Herard, that compression anaemia of the lung accounts for the cessation of symptoms. Hyperaemia and "bronchopulmonary catarrh" are not important factors in the "phthisiogenic" process of the lungs. If so, why should cough and expectoration cease instantly? On the other hand, the new mechanical conditions produced in one-half of the thorax with the onset of a pneumothorax are a logical and sufficient reason for diminution or disappearance of the cough and sputum. *October 15, 18 & 29, 1882:* The value of the pressure of the pleural air in relation to blood circulation in the collapsed lung needs further elucidation. It is known that pulmonary perforations usually occur during violent physical efforts, especially coughing, which is a forced expiration preceded by an inspiration, the escape occurring during the succeeding inspiration. If the lumen of the perforation allows entrance into the pleura of air sufficient to neutralize the inspiratory depression, the lung stays immobile; if not, gradually a disequilibrium comes about. Under normal conditions the pulmonary elasticity is represented by the equivalent of 5 to 7 mm. Hg. Therefore, when the pleural depression exceeds this, the lung takes part in inspiration. On the other hand, as the lumen of the rupture enlarges during inspiratory dilatation and shrinks during expiration, relatively more air passes from the lung into the pleural space, intrapleural pressure is raised, and the lung becomes immobile. If the rupture remains pervious, a fragment of pleural exudate acting as a valve, the mass of intrapleural air increases, the thoracic cage dilates to its maximum, and we have displacement of the mediastinum and viscera and exaggerated dyspnoea. The highest pressure the contained air can reach during inspiration is identical to the atmospheric normal, which it exceeds considerably during expiration, with the glottis closed. In phthisis the inspiratory negative pressures are unduly low, and the positive expiratory pressures below normal. It should also be noted that extreme dyspnoea is rare in consumptives, and when it attends spontaneous pneumothorax is apt to be of shorter duration and less marked than in nonphthisical persons. The inspiratory pressures often oscillate around 10 mm. Hg. At the same time, there is more contraction of the thoracic wall and also diminished volume of air in the chest as compared with the normal capacity. Even in a closed pneumothorax physiological factors do not allow gases to stay long at a pressure higher than that under which the gases of blood are dissolved, which is normal atmospheric pressure. *October 29, 1882 & November 5, 1882:* According to Forlanini's "monistic" conception and explanation, a diseased lung "becomes consumptive" because of its unceasing movements of expansion and contraction. When this motion ceases, the ulcerative process ceases. The objection that the 26 reported French cases are in a minority is met by the retort that the patients who have succumbed have done so because of serious associated conditions. In other words, "pneumothorax by perforation does not choose its patient" or observe a fixed volume. The almost con-

stant complication of pleural exudate is discussed and shown to reduce the fully successful endings to the exceptional. Because liquids are incompressible they can in no way contribute to fill the increased pleural capacity during inspiration. On the other hand, to induce artificial pneumothorax the physician can choose both patient and time of operation. It is easy of execution, relatively harmless, and the function of the operated lung may be regained entirely or in part. The absorption of air and its rapidity depend largely on the condition of the pleura. "It should be easy [*sic*] to prevent the occurrence of effusions and pleuritic processes that often end in pyothorax, a constant complication of accidental pneumothorax. . . . . All causes will be removed [*sic*] when aseptic air is introduced . . . . through a carbolated solution, or . . . . a neutral gas, for example, nitrogen . . . . instead." Thus, Forlanini sees the proposition of artificial pneumothorax in phthisis supported . . . . as a necessary, logical, obvious offspring of clinical facts . . . . and of the most elementary ideas of physiology and physics. Its ultimate application to human phthisis seems only a matter of time.—*Forlanini's Original Communication on Artificial Pneumothorax, S. Lojacono, American Section, Tubercle, November, 1934, xvi, 54.*—(*A. P.*)

Forlanini on Artificial Pneumothorax.—Forlanini again emphasizes the destruction of tissue as the outstanding anatomical and characteristic fact of phthisis, which he refers almost exclusively to "secondary products of association," whose effects on the lung differ from those on other organs because of peculiar functional and mechanical conditions. He presents microscopical sections from a part of a lung of a tuberculous patient to whom pneumothorax gave two years of relative recovery, the patient succumbing to disease in the other lung. The cicatricial and fibrous changes about the old necrotic foci are pointed out: Forlanini now reports on 2 consumptives cured by a *spontaneous pneumothorax* followed by empyema. The first of these died suddenly some months after being practically well; the second, a young girl, has remained well six years after the occurrence of her pneumothorax. Forlanini then adds his observations on several cases of *artificial pneumothorax* practised by him. He states that he limited himself to subjects in most of whom the presence of bilateral lesions removed any reasonable hope. He discusses the *technique of penetrating between the pleural layers*, and of using several centimetres of water in a glass jar as a *pressure indicator*. The air in the glass jar was filtered (through the water?). Forlanini measured his dosage, usually 200 to 250 cc. of air, and repeated measured refills according to clinical and symptomatic indications. He observed that: *1:* The pleura tolerates air perfectly and he had never (up to that time) observed any pleural effusion or symptoms of pleural irritation. The importance of aseptic technique is emphasized. *2:* The pleura absorbs oxygen more rapidly than nitrogen, for which reason he recommends the latter gas, filtered through cotton. *3:* The absorption rate becomes gradually slower, due to changes in the pleura. *4:* Pleural adhesions limit the volume of the pneumothorax and therefore its effectiveness, although they may in some instances be stretched or separated. *5:* When the pneumothorax is gradually induced, there is less discomfort and functional disturbance. *6:* Although the curative results were meagre because of the poor type of case selected, the diminution or disappearance of stethoscopic findings was observed, though often overshadowed by evidence of progressive disease in the other lung or elsewhere. In conclusion, Forlanini hopes that in some special cases this therapy may find a place in the extensive but ephemeral and deficient armamentarium against phthisis. Its action is mechanical, innocuous, and assists the natural healing processes.—*First Attempts at Artificial Pneumothorax in Pulmonary Phthisis, C. Forlanini, Gazzetta Med. di Torino, May 17, 1894, lxv, 381, transl. by S. Lojacono, Tubercle (American Section), December, 1934, xvi, 121.*—(*A. P.*)

Types of Artificial Pneumothorax.—Artificial pneumothorax has developed in technique from the complete collapse advocated by Forlanini to the hypotensive collapse of Ascoli (1912) and what is now known as *selective collapse* (Barlow and Thompson, 1921). The primary object of selective collapse is to maintain uniformly complete collapse of the diseased part of the lung and at the same time permit full function of the healthy part. In this form of collapse the air has a tendency to localize itself around the diseased area of the lung regardless of whether the disease is located in an upper or a lower lobe. The expansile action of the healthy part of the lung by repeatedly compressing and forcing the imprisoned air in the pleural cavity toward the diseased area little by little completely collapses the diseased part and then keeps it collapsed indefinitely. Selective collapse minimizes respiratory disturbance, prevents circulatory distress and throws the least amount of work on the contralateral lung. It has reduced the incidence and seriousness of pleural effusion and

is undoubtedly the procedure of choice. The best type of case for simultaneous bilateral pneumothorax is one in which the lesions are not too far advanced and are definitely limited to the upper lobes, or when there has been a recent spread of the disease in the contralateral lung, necessitating prompt intervention. Such patients can be helped materially by bilateral pneumothorax. There need be no dyspnoea or other signs of discomfort. The chief disadvantages are the difficulty of management and the frequency with which refills must be given. Alternating or successive pneumothorax is especially indicated in patients who develop contralateral disease during pneumothorax treatment or who have bilateral disease equally distributed when first seen. Alternating pneumothorax is on the increase largely because the majority of patients subjected to collapse therapy have considerable disease in both lungs. Some operators prefer it to simultaneous bilateral collapse as a safer and simpler procedure, and there is much to support such a view, the most involved side being collapsed first and a careful watch kept on the contralateral lung.—*Clinical Types of Therapeutic Pneumothorax and Their Significance, J. W. Cutler, Jour. Am. Med. Ass., July 14, 1934, ciii, 81.*—(*G. L. L.*)

Simultaneous Bilateral Artificial Pneumothorax.—Bilateral artificial pneumothorax has not received the attention it deserves. This report covers the experiences realized in 90 cases. There was a ratio of almost 3 females to 1 male, and all had advanced or moderately advanced disease. The three primary indications for induction of bilateral collapse were (1) extension to or reactivation of disease in the contralateral lung; (2) extensive bilateral disease; and (3) pulmonary haemorrhage. Bilateral collapse presents hazards additional to those of unilateral collapse and frequent observations must be made. The complications may be listed as (1) accidental pneumothorax, a relatively common accident with unilateral pneumothorax also but more serious with bilateral collapse, and noted 18 times in this whole series, when air had to be withdrawn 15 times; (2) spontaneous pneumothorax, not encountered in this series; (3) overcollapse of lung; (4) mediastinal hernia; (5) pleural effusion; and (6) purulent effusion. Two patients, in addition to bilateral pneumothorax, had phrenic operations with no untoward symptoms. The treatment in 35 of these 90 cases must be considered clinically successful and in 23 partially successful. Three cases are too recent for classification and there were 29 failures. This procedure has a definite though limited field in the treatment of bilateral tuberculosis. The results obtained indicate its wider application in selected cases.—*Simultaneous Bilateral Artificial Pneumothorax in the Treatment of Pulmonary Tuberculosis, P. M. Mattill and T. J. Kinsella, J. Thorac. Surg., October, 1934, iv, 13.*—(*J. F. B.*)

Bilateral Artificial Pneumothorax.—If during the progress of a monolateral pneumothorax, a small new focus of infection is noted in the contralateral lung, the prompt induction of a second pneumothorax on the newly affected side will prevent serious spread of the disease. Some such cases have cleared by expectant treatment, but the time involved is usually long and the results are uncertain. An early second pneumothorax offers a more tangible therapeutic measure. Lesions arising from the hilum region, with a tendency toward mesial rather than peripheral localization, are favorable indications for the institution of contralateral collapse therapy. The spread of the disease which occurs during the course of a unilateral therapeutic pneumothorax denotes that the collapse is not effective. The second pneumothorax in these cases often improves the efficiency of the first.—*Studi sul pneumotorace terapeutico bilaterale, V. Fici, Revista di patologia e clinica della tubercolosi, January, 1934, viii, 42.*—(*U. E. Z.*)

Bilateral Pneumothorax.—The normal capacity and the residual air show only a slight decrease in cases of bilateral pneumothorax, while the total capacity following deep inspiration is markedly changed. The vital minimum volume is consequently equal to the residual air. The effective collapse of the lung is so small that there is no practical influence. In conclusion the author emphasizes the X-ray examination in all cases of bilateral pneumothorax to be taken in suspended respiration and not in the stage of deepest inspiration. The findings also prove the fact that in these cases there is only a minute degree of clinical and subjective symptoms of shortness of breath.—*Der Lungenkollaps bei doppelseitigem Pneumothorax, A. J. Anthony, Klin. Wchnschr., October, 1934, xiii, 1432.*—(*F. G. K.*)

Accidents during Pneumothorax Treatment.—During the course of more than 250,000 instillations of air given tuberculosis patients, the following points of interest were noted: Injections of air into the tuberculous pulmonary tissue rarely caused air embolism. This is shown in the case of one patient who received 25,000 cc. of air into the lung parenchyma during the

course of 50 refills without having shown any grave symptoms. Accidents occurred immediately after or just before instillation of air into the pleural cavity. In 63 cases accidents occurred during the course of 229,000 instillations of air, approximately two accidents for every 10,000 treatments. One-fourth of all accidents occurred during the first induction, the rest during refills of already established pneumothoraces. Fifty-two per cent of the accidents took place before any air was injected into the pleural cavity, 29 per cent during the passage of air, and 19 per cent after the operation was completed. The proportion of accidents was the same whether a sharp short beveled or a blunt needle was used. Localized neurological symptoms were present in two-thirds of all cases in which the accident occurred. The symptoms were those of paresis, monoplegia, hemiplegia or aphasia with or without epileptiform or amaurotic attacks. Most of the symptoms lasted only a few minutes, some lasted a few hours; one case of hemiplegia lasted a month, and in one case symptoms of amaurosis persisted until death. In the great majority of cases no trace of the accident was left behind. Five of the 63 accidents were fatal. In these, death followed either immediately or within a few hours. No attempt is made to explain the pathogenesis of these accidents which occurred during induction of air into the pleural cavity. The introduction of antiseptic solutions of irritating nature into the pleural cavity as a cause of pleural shock is recognized, as proved experimentally in animals and clinically in patients.—*E. Frommel and M. Demole, Rev. Tuberc., January, 1934, ii, 11.*—(*J. P. N.*)

Empyema during Artificial Pneumothorax.—A comparative examination of 80 cases of pneumothorax empyema occurring at Söderby Hospital, 1916–1931, was made. The number of severe exudative cases was smaller in benign (25 per cent) than in malignant (40.6 per cent) cases and in secondarily infected empyema (50 per cent). The relative number of malignant empyemata decreased from 68.4 to 29.2 per cent of all cases of empyema from 1916 to 1931, and the benign empyemata increased in corresponding degree. The total incidence (8.5 per cent) of pneumothorax empyema also decreased, and was considerably lower than in statistics from elsewhere. Conservative treatment yielded satisfactory results in the benign empyemata. The mortality of the malignant empyemata was greater than of the benign. Spread of the disease to the other lung occurred most frequently in the exudative cases. The mortality occurring from pneumothorax empyema in which cauterization of adhesions was performed, was 66 per cent, whereas it was 43.3 per cent in cases in which it was not performed.—*Empyema during Pneumothorax Treatment, E. Jonsson, Acta Tuberc. Scandinav., Fasc. 3, 1934, viii, 191.*—(*F. B. S.*)

Artificial Pneumothorax in Private Practice.—In patients with pneumothorax established in hospitals or sanatoria who are transferred to further ambulant treatment certain precautions must be observed. Change in the patient's activity means also change in the time of absorption of the pneumothorax. The pressure should be low in order to avoid changes due to the vibrations during the transportation of the patient. It is not advisable to introduce an active treatment of pleural effusions. "Iodipin" instillations are recommended for pleural thickening. Differences between the altitudes of the place at which the refills are given and the place of residence of the patient may give rise to serious fluctuations in the intrapleural pressure. It is reasonable to increase the interval between the refills in the doctor's office in part to avoid too frequently repeated X-ray examinations.—*Einige Besonderheiten der Gasbrustbehandlung insbesondere beim Uebergang von den Heilstaetten zu den Sprechstundennachfuellungen, H. Schoenemann, Ztschr. Tuberk., February, 1935, lxxii, 190.*—(*F. G. K.*)

Thoracoplasty versus Artificial Pneumothorax.—Pneumothorax has rendered momentous service in the treatment of pulmonary tuberculosis but its shortcomings should not be ignored. It is a long procedure, so few cases showing strict selective collapse as to make it frequently necessary to collapse large portions of healthy lung tissue, and in 40 per cent of the cases satisfactory collapse cannot be obtained. Management of the patients demands skill, and experience and serious complications may occur at any time. Reëxpansion of lungs collapsed by pneumothorax presents problems difficult of solution, a pleural cavity maintained for any length of time represents a potential danger of infection, and, finally, it must be remembered that of the 40 per cent of patients in whom collapse is possible, only approximately half realize clinical cures. That is, there are 70 to 80 per cent failures or deaths. Thoracoplasty, on the other hand, yields 40 to 60 per cent clinical cures in the patients upon whom pneumothorax has failed. Pneumothorax, however, should not be abandoned and replaced by thoracoplasty, but the latter is the more efficient and should be on an equal footing with pneumothorax.

The important factor in closure of cavities is the closure of the bronchi through which cavities communicate with the bronchial tree. Closure of the bronchi causes absorption of the air in the cavities, their shrinkage and final disappearance. The speed of closure depends upon the thickness of the cavity walls. An early or immediate negative sputum is caused by the prompt closure of the bronchi. Unilateral apical cavities offer the most typical indication for thoracoplasty. Another is a far-advanced unilateral lesion with cavitation and most of the lung tissue destroyed. With lesions in midlung or base or paramediastinal area pneumothorax should be tried first. Bilateral thoracoplasty should be employed in bilateral apical lesions, or it may be used on one side with pneumothorax on the contralateral side. In all other cases pneumothorax is preferred.—*Thoracoplasty versus Pneumothorax, P. N. Coryllos, J. Thorac. Surg., October, 1934, iv, 30.*—(*J. F. B.*)

Extrapleural Thoracoplasty.—This report covers the combined results of 3,762 cases reported in the literature since 1926 and 200 of the authors' own cases. The combined mortality during the first 8 weeks was 10.5 per cent with variations between 3 and 21 per cent. Many surgeons report lower rates in their later cases. Deaths during the first 8 weeks were from one-third more than one-half of that during the first 5 years. Of the living patients, symptom-free and able to work in the whole group, there were 40.1 per cent after 1 year and 35.4 per cent after 2 years. The group able to do some work, but not bacilli or symptom-free after 1 year, was 14.7 per cent of the whole and 10.9 after 2 years. Those not able to work constituted 7.1 per cent after 2 years and the results not evident were 9 per cent. Of the total number operated upon, 35.4 were clinically cured and 22.2 per cent improved, or a total of 57.9 per cent favorable results. The final results of limited partial thoracoplasty cannot be stated at this time. Some 10 detailed tables show results of the various patients followed from operation to periods up to 12 years. A high percentage of cured patients have returned to their former occupations. Surgical treatment offers the best if not the only prospect of arrest of tuberculosis to a definite group of patients.—*The Results of Extrapleural Thoracoplasty in the Treatment of Pulmonary Tuberculosis, C. A. Hedblom & W. Van Hazel, J. Thorac. Surg., October, 1934, iv, 55.*—(*J. F. B.*)

Thoracoplasty in Bilateral Tuberculosis with Cavity.—The employment of thoracoplasty in bilateral tuberculosis necessarily requires consideration of (1) the extent of the contemplated procedure and the individual biological endurance, (2) the ability of the individual to make use of the surgical aid, and (3) the possible irreparable damage to the existing power of resistance. The purpose of all treatment is the relief of the individual from the main focus of intoxication. The extension of the process is of secondary interest. Destroyed lung tissue possesses no respiratory function but it is pernicious for the individual. The demand for complete health of the contralateral lung is absolutely wrong. The indication for thoracoplasty in individuals with bilateral cavitation depends upon differentiation between the cavities of secondary and of tertiary allergy. The former is the result of softened pneumonic infiltration while that of tertiary allergy is formed slowly by the softening of parts in a large infected area, the walls are rigid and rarely heal spontaneously. The tertiary cavity belongs to thoracoplasty. The absence of myocarditis and of extrapulmonary foci and a vital capacity of 40 per cent must be assured. Given these conditions unilateral or bilateral surgery should be employed. In 25 patients with bilateral cavitation, 60 per cent are shown to be saved (24 per cent completely restored) and only 40 per cent lost in contrast to an expected 100 per cent mortality. The complete resection of the first two ribs is a great step forward. Aspiration even in patients with large amounts of sputum is not dreaded. Thoracoplasty can be individualized in regard to the condition of each patient. Partial thoracoplasty can usually be performed in one operation and it makes unnecessary the operations of plombage. It is the operation of the future.—*Thoracoplasty in Bilateral Cavernous Tuberculosis, H. Jessen, J. Thorac. Surg., October, 1934, iv 1.*—(*J. F. B.*)

Repeated Thoracoplasty.—In analyzing patients who had to undergo secondary thorocoplastic operations, the following general conclusions were reached: Cavities which are located in the paravertebral region, particularly in the upper portions, sink frequently into the paravertebral gutter, where they are protected from collapse. Such cavities can be closed only when both the sternal and vertebral stumps of the ribs are removed and when the noncollapsed part of the lung is freed extrapleurally from the vertebral column. Upper-lobe cavities which are adherent anteriorly can be closed by a complete removal of the sternal portions of the 1st, 2nd and 3rd ribs. When the overlying soft parts are much indurated, they must be excised to allow complete collapse.

The application of these factors to primary thorocoplasties is as follows: In paravertebral cavities, it is advisable to add to the radical thorocoplasty an extrapleural pneumonolysis. Intercostal muscles should be fixed in the peripleural tissue between the lung and the vertebral column. In the presence of large upper-lobe cavities, particularly when they are adherent anteriorly, the entire 1st and 2nd ribs should be removed. Apical cavities should be treated by thoracoplasty in addition to apicolysis. Indurated soft tissues overlying cavities should be removed.—*Erfahrungen über Fälle von Rethorakoplastic, D. Szeloczey, Beitr. Klin. Tuberk., October, 1934, lxxxv, 377.*—(*M. P.*)

Results following Thoracoplasty.—After three years, out of a group of 17 patients receiving total paravertebral thoracoplasty, three were improved, seven remained stationary, one was aggravated, and one died. In order to obtain the maximum collapse, it is necessary that the mediastinum remain rigid. Shortly after operation improvement occurs, but aggravation of the disease often follows. This is due to contralateral shifting of the mediastinum, with resumption of functional activity in the collapsed lung or to a spread of the disease itself. All cases after paravertebral thoracoplasty have a mechanical circulatory imbalance. In favorable cases the circulatory disturbances subside after a few months. In elderly people with emphysema and myocardial disease, adaptation to postoperative changes is impossible.—*Risultati a distanza di una serie di operati di toracoplastica paravertebrale totale, C. Zannelli, Lotta contro la Tubercolosi, December 1933, iv, 1313.*—(*U. E. Z.*)

Thoracoplasty in Rabbits.—In the lung collapsed by thoracoplasty, there is marked hyperaemia and stasis throughout the lung. This was noted in animals with partial thoracoplasty as well as those with complete collapse. In the areas of greatest compression congestive changes were more marked, with diapedesis of blood cells into the alveolar spaces. Atelectasis was also present. Hyperaemia was also noted in the contralateral lung, but occurred much later than on the operated side.—*Toracoplastiche sperimentali sul coniglio, D. Donati, Revista di patologia e clinica della tuberculosi, January, 1934, viii, 32.*—(*U. E. Z.*)

Phrenic Neurectomy.—*Plan of study:* During the past two years 83 cases of phrenic neurectomy were performed at Middlesex County (Massachusetts) Sanatorium, 54 permanent and 29 temporary. All were analyzed separately, clinically and roentgenologically, and conclusions reached as to their benefits. Roentgenologically, the amount of retrogression of the lesions was estimated and an improved method of measuring diaphragmatic elevation was devised. The degree of fixation or movement was also determined by fluoroscopy, 69 patients being fluoroscoped at various intervals. The average rise in the improved or arrested was nearly twice that in the unimproved cases. Obviously, in extensive disease with numerous pleural, especially basal adhesions, diaphragmatic rise is impeded and in these cases the outlook is usually unfavorable. On the other hand, a marked rise may occur with no corresponding real improvement in the disease. Roentgenographically, of 33 in which retrogression of pathological changes was evident, 31 showed this within six months and 23 within three months. Most cases, improving initially but later doing poorly, showed contralateral spread and cannot be cited as failures nor can those supplemented by long periods of rest necessarily be considered improved by operation *per se*. Although the efficacy of therapy probably cannot be definitely estimated within six months, certainly the inefficacy of a procedure should be. Of the series from December, 1931, to November, 1932, only 33 per cent can now be classified as having been benefited. From November, 1932, to June, 1933, the figure was 50 per cent, and from then to December, 1933, 43 per cent. Of the entire group approximately 40 per cent have been benefited. Those done as a preliminary to thoracoplasty without improvement were included as failures. *Relation of results to location, type and extent of disease: 1:* Unilateral upper-lobe cavitations, predominantly fibrocavernous. Improvement was noted in 27.7 per cent of cases. *2:* Bilateral upper-lobe cavitation, comparatively recent. Improvement was noted in 61.6 per cent of cases on the treated side. *3:* Upper-lobe disease without cavitation. Two-thirds of 6 cases (66.7 per cent) were improved. *4:* Bilateral disease with middle or lower-lobe cavitation. Only one case (11.1 per cent) was improved. *5:* Uncomplicated middle- or lower-lobe cavitation. Seven cases, or 77.7 per cent, were improved. *6:* As an adjunct to unsatisfactory pneumothorax. Two-thirds of 9 cases (66.7 per cent) showed improvement, relaxation of the diaphragm being most beneficial where basal adhesions existed. Uniformly poor results obtained in dense fibrocavernous disease above the midportion of the lung. Other types of surgery are to be preferred here without delay. Paralysis of

the diaphragm is effective in (1) cavitation in the lower lobe, about the hilum, and occasionally in recent thin-walled upper-lobe cavities; (2) recent disease about the hilum and at the base; (3) as a supplementary measure (a) in partial but unsuccessful pneumothorax, and (b) in reëxpanding pneumothorax; (4) as a second-choice operation in (a) recurrent haemoptysis, pneumothorax being unsuccessful, and (b) to control symptoms in severe phthisis.—*Phrenic Neurectomy in Pulmonary Tuberculosis. The Evaluation of Early Effects, H. F. Hare & L. F. Davenport, New England J. M., October 25, 1934, ccxi, 762.*—(*A. P.*)

Phrenicectomy.—This article is a brief review of the permanent results obtained in a series of cases operated on previous to July, 1932. Although the operation was done on 223 cases, only 153 of them had no other surgical treatment and hence furnish material for a true statistical analysis. It is now found that a permanent satisfactory result has been obtained in 55 of these, the 98 remaining cases showing no positive indications of lasting beneficial results. These figures mean that a little more than one-third of the cases derived lasting benefits from the operation. Of the 55, eleven had already shown marked improvement before the phrenicectomy was performed. In another 17 cases the patients continued to expectorate tubercle bacilli. This leaves only 27 cases of which it can be said that the patients were healed as the result of the phrenic operation. It must not be forgotten that all of these patients had been living under sanatorium regimen both before and after the operation; hence it may have been a combination of methods rather than the evulsion itself that resulted in the benefits described. In considering the cause of negative results it must be remembered that in most cases it is the healthy lower lobe which is disturbed in function, while the affected apical area shows no benefit. This is in striking contrast to the favorable development of collapse therapy following the principle of selection. Any interference with the phrenic nerve *must* be considered as causing a contraselective lung collapse in all cases in which the affection is apical. The statement that paralysis of the diaphragm acts equally effectively on the upper and the lower lobes is contradicted by the fact that basal or middle-lobe affections were found proportionally in three times as many of the successful cases as of the cases with negative results. Furthermore, follow-up statistics have shown that thoracoplasty is deprived of some of its benefits when it is preceded by a phrenic evulsion. The author considers phrenicectomy to be indicated as an independent collapse method only when artificial pneumothorax has proved a failure; when the lung affection is so located in the middle or lower lobe that this operation may be expected to have good results; and in apical affections only when thoracoplasty must be considered impossible either because of the age of the patient or because the patient definitely refuses to undergo that operation. When it is difficult to decide whether or not a phrenicectomy may be expected to help the patient the author recommends temporary paralysis by nerve-crushing. This leaves the way open for the reëstablishment of the diaphragmatic movement; or for the final paralyzing of it by subsequent evulsion of the nerve, if found advisable in the light of the further developments of the case.—*The Place of Phrenicectomy in the Treatment of Pulmonary Tuberculosis, J. Gravesen, Brit. J. Tuberc., January, 1935, xxix, 12.*—(*J. S. W.*)

Phrenicoexairesis.—Of 54 tuberculosis patients reported as "not benefited" by phrenicoexairesis, not a single one was influenced beneficially in any way, and in 40 a more or less healthy basal lung was damaged. Phrenicoexairesis, therefore, holds a very modest place in tuberculosis therapy. Exairesis can render excellent results in retracting lung processes, especially during the use of pneumothorax treatment. Furthermore, exairesis is indicated in total and basal infections when (1) artificial pneumothorax cannot be established, (2) when the character of the process permits a later regeneration of the functions of the affected lung tissue, and (3) when a plastic operation is indicated. The case histories of 27 patients are presented.—*Über den Wert Phrenicoexairese für die Behandlung der Lungentuberkulose, M. F. Sinding-Larsen, Acta Tuberc. Scandinav., Fasc. 3, 1934, viii, 207.*—(*F. B. S.*)

Phrenic-Nerve Intervention.—A total of 68 cases of phrenicectomy performed between 1924 and 1932 was studied. Duration of observation ranged from one to three years. Of the 68 patients 9 are dead, 9 can be considered cured and 50 still have more or less active lesions. Of this last group, 27 had shown some improvement several months after the operation but later had shown reactivation. For this reason observations should be made at least four or five years after treatment in order to arrive at an opinion. The above 9 cases of cures were studied in detail and the following points of interest noted: Five had cavities without dense infiltrations around them. The lesions

dated back six to fifteen months. The cavities disappeared in about six months. Three of them were apical, one was near the hilum, and one at the base. Three of the 9 had infiltrative lesions containing several small cavities with involvement of the pleura. Improvement was slow in these cases but finally signs of activity in the lung and bacilli in the sputum disappeared. The last case was one of more recent and more acute infiltration. Among the 59 showing unsuccessful results were those with large apical cavities. No favorable results were obtained from phrenicectomy on acute pneumonic infiltrations. The temporary subsidence of symptoms of the disease in 27 cases is explained by the belief that the effect of the operation was to cause a sort of stagnation in the course of the disease by gradual improvement in the general condition of the patient, dropping of the fever and often some gain in weight; sooner or later all of them showed reactivation of their disease in a more severe form. During the last eight years temporary paralysis of the diaphragm has given practically the same results as those with permanent paralysis. When pneumothorax, which is preferable, is unsuccessful, temporary paralysis of the diaphragm is the procedure of choice.—*E. Sergent & C. Launay, Arch. Méd.-Chir. l'App. Resp., ix, 31, 1934.*—(*J. P. N.*)

Alcoholization of Phrenic Nerve.—In some cases of pulmonary tuberculosis it is difficult and often impossible to determine beforehand whether a proposed phrenicectomy will be efficacious or not. It has been a common experience, following operations on the phrenic nerve, to find that diaphragmatic paralysis does not occur. In such cases and as a preliminary to further treatment, alcohol injections into the nerve have proved of great value. In some patients, marked improvement and adequate collapse was obtained by this method alone. It certainly does no harm and may obviate the necessity of more extensive operative procedures.—*Il valore dell'alcoolizzazione del nervo frenico nella cura della tubercolosi polmonare, D. Michelli, Revista di Patologia e clinica della tubercolosi, February, 1934, viii, 138.*—(*U. E. Z.*)

Scaleniotomy and Phrenicectomy.—The ideal lesion in which to expect response to scaleniotomy is one above the 2nd rib, and if cavity be present it should be thin walled and 4 cm. or less in diameter. Honeycombed cavities proved definitely refractory to closure. Some 135 scaleniotomies are reported. Ninety patients had far-advanced and 44 moderately advanced tuberculosis; 96 had bilateral disease; 125 had cavity-formations; and 115 had positive sputum. Twenty-nine had inefficient pneumothorax. Thirty cases were terminal and only relief was expected and obtained. Because the operations were performed only in the past 30 months only the closure of cavities and negative sputum results are considered. Nearly 36 per cent of the cavities were closed by scaleniotomy and phrenicectomy, and 50 per cent showed negative sputum. In the group in which scaleniotomy as an independent procedure was employed from 6 months to 3 years subsequent to phrenicectomy the results are very similar, for 31 per cent of the cavities were closed and 43 per cent showed negative sputum.—*Scaleniotomy with or Subsequent to Phrenicectomy in the Treatment of Pulmonary Tuberculosis, L. Fisher, J. Thorac. Surg., iv, 41.*—(*J. F. B.*).

Wax-Gelatin Plombage.—Comparing a number of different materials for plombage in animal experiments, it was found that a mixture of wax and gelatin worked most satisfactorily. Observations extending over two years showed that this material is retained without undue irritation, without resorption and with a solid organization of the plombage, so that migration and perforation are prevented.—*Die Wachs-Gelatineplombe, P. G. Schmidt, Beitr. Klin. Tuberk., December, 1934, lxxxv, 611.*—(*M.P.*)

Paraffin Plombage.—In 16 cases in which paraffin filling was done for the obliteration of cavities in the apices or in the upper lobes, the primary mortality was 2 cases, both of which were caused by perforation. In one case there occurred a tuberculous infection of the bed of the plombage and perforation through the skin. Out of 11 patients, who were observed 1 to 4 years, 3 cases became quiescent following plombage alone. Two cases were complete failures. Clinical improvement occurred in 6 cases. In 5 patients plombage and secondary thoracoplasty were performed. Quiescence and clinical cure occurred in 3 cases after removal of the plombage and thoracoplasty. One case became stationary, but continued to have bacilliferous sputum. In one case the observation period was too short for judgement.—*Erfahrungen mit der Paraffinplombe bei Oberlappenkavernen, A. Neddermeyer, Beitr. Klin. Tuberk., December, 1934, lxxxv, 38.*—(*M. P.*)

Pleurolysis.—To aid in the collapse of certain types of cavities held open by adhesions between visceral and parietal pleura even after thoracoplasty pleurolysis is proposed. This procedure is the stripping of

the parietal pleura from its attachments to the chest-wall and the endothoracic fascia. It is done at the time of the thoracoplasty and is a part of the thoracoplasty technique. The pleurolysis should be carried down far enough to completely release the lung.—*Pleurolysis, S. A. Thompson, Am. J. Surg., September, 1934, xxv, 487.*—(*J. F. B.*)

Thoracoscopy by Single Puncture.—A new instrument for intrapleural pneumonolysis is described. It consists of a single cannula through which are carried into the thorax all the tools requisite for coagulating and cutting intrapleural adhesions. The entire operation is carried out through a single puncture in the chest wall.—*Thoracoscopy by Single Puncture, F. G. Chandler, Lancet, August 18, 1934, ccxxvii, 357.*—(*B. T. McM.*)

Evipan Sodium as Anaesthetic.—An analysis of 85 cases of pulmonary tuberculosis in which evipan sodium was used as an intravenous anaesthetic is presented. The use of evipan anaesthesia in pulmonary tuberculosis has proved to be entirely safe. It does not, however, effectively take the place of mild inhalation anaesthesia for major thoracic operations. Generally speaking, though not always, the dosage of evipan required for minor operations in phthisical patients seems to be higher than that required to produce an equivalent degree of anaesthesia in nonphthisical subjects.—*Evipan Sodium as an Anaesthetic in Pulmonary Tuberculosis, M. Lask & J. H. Crawford, Lancet, August 11, 1934, ccxxvii, 308.*—(*B. T. McM.*)

Tuberculin Reaction in Rheumatic Fever.—When the tuberculin test was applied to 245 children with rheumatic fever and to an equal number of children ill with diseases other than rheumatic fever, tuberculosis, or sepsis, the incidence of reactors was found to be comparable in the two groups,—rheumatic fever, 26.9 per cent and control group 24.4 per cent. The positive reactors in each age-group were comparable, the percentage rising rapidly from three to nine years of age. The reaction to tuberculin was about the same in the active (26.6 per cent) and the inactive (28.5 per cent) phases of rheumatic fever. The 44 chorea patients included in the rheumatic-fever group reacted about the same as the group as a whole. No systemic or local flare up was observed in any patient. Neither was there any alteration in the tuberculin reaction either in the direction of hyperergy nor anergy. It was impossible to find anything speaking in favor of rheumatic fever being a tuberculous disease.—*The Tuberculin Reaction in Rheumatic Fever, F. Pascher, Am. J. Med. Sc., October, 1934, clxxxviii, 537.*—(*E. M. J.*)

Traumatic Rupture of Lungs without External Trauma.—This report deals with traumatic rupture of the healthy lung. The increase in the number of deaths by violence further emphasizes the fact that extensive damage to internal organs frequently occurs without external evidence of trauma. Three types of traumatic rupture of the lungs without injury to the chest-wall are here described and illustrated, as follows: *1: Pneumothorax type:* Here simple rupture of a few alveoli leads to pneumothorax without indications of parenchymal damage. The case cited is that of a young woman of 19, who slipped off a household stepladder and felt something unusual in the right side, which X-ray examination showed to be pneumothorax with complete pulmonary collapse. No evidence of tuberculosis or other parenchymal involvement could be found on repeated observation over eighteen months and recovery was complete. *2: Parenchymal rupture:* Here rupture of pulmonary parenchyma occurs without pleural damage. There are numerous parenchymal haemorrhages with complete disintegration of lung tissue and extensive ecchymoses, with no evidence of pleural damage. Haemoptysis is the cardinal symptom. Moore's case is cited of a man of 42 who was felled by a blow on the chin and showed, in addition to haemorrhage into the fourth ventricle, several haemorrhages into the left upper lobe of the lung. Death occurred rapidly. *3: Combined type:* Here the visceral pleura and the lung both show marked damage. The case cited is that of a girl of 15 who collided with a motor car while riding a bicycle and was thrown into the air, receiving multiple bone fractures but none of the chest-wall nor any other external damage to it. However, two and one-half pints of blood were found in the pleural cavity and the lung was collapsed with lacerations on the posterior and internal surfaces of the right lower lobe and one on the right upper, a portion of which was nearly severed. Haemorrhages, ecchymoses and areas of disintegration were extensive throughout both lungs. A number of similar cases are mentioned. *Discussion:* It is suggested that the mechanism of these conditions depends on these factors: (1) resilient ribs, (2) expanded lungs, and (3) a closed glottis. Under these circumstances the effect of sudden violence might be likened to the bursting of a blown-up paper bag, with the greatest damage on the side subjected to the greatest force. It should be emphasized that extreme violence

often occurs in the absence of bruising.—*Traumatic Rupture of the Lungs without Signs of Trauma in the Chest Wall, W. E. Cooke, Brit. M. J., October 6, 1934, 629.*—(*A. P.*)

Pulmonary Capacity in Asthma.—Measurements of the total pulmonary capacity and its subdivisions were made by the authors during the acute respiratory distress stages in 5 cases of bronchial asthma; measurements were repeated following relief after the administration of epinephrine. In a sixth case these measurements were determined after spontaneous recovery. During the acute respiratory distress of asthma these measurements showed a decrease in the absolute and relative value of the vital capacity, and a marked increase in the mid-capacity and residual air. Shortly after the administration of epinephrine there is an increase in vital capacity and a marked decrease in the mid-capacity and residual air, with an accompanying palliation or disappearance of the respiratory distress. In the case in which no drug was administered, the measurements during the acute distress and two days later showed the same relative changes. In two normal subjects a moderate decrease in vital capacity was observed following the administration of acetyl-beta-methylcholin, which has a broncho-constricting action. The decrease affected chiefly the complementary air. Due to the evanescent action of the drug residual air and mid-capacity measurements were not accurate.—*Studies of Total Pulmonary Capacity and its Subdivisions. VII. Observations during the Acute Respiratory Distress of Bronchial Asthma and Following the Administration of Epinephrine, A. Hurtado & N. L. Kaltreider, J. Clin. Invest., November, 1934, xiii, 1053.*—(*G. L. L.*)

Pulmonary Capacity in Obstructive Emphysema.—Studies of the total pulmonary capacity and its subdivisions are reported by the authors for a group of 24 males and 2 females, all presenting pulmonary emphysema, most of the patients having bronchitic asthma. Ages averaged 45 years, varying from 17 to 64, with only two below 20 years. Measurements of chest expanding capacity were made; all were cases of the obstructive type of emphysema. The findings were correlated with the degree of respiratory disability. It was found that in general the ability to expand the chest in pulmonary emphysema is diminished. There are definite alterations in the subdivisions of the pulmonary capacity, consisting chiefly in absolute and relative decrease in the vital capacity, and absolute and relative increase of the mid-capacity and residual air. The total capacity is as a rule normal. The decrease in the vital capacity affects chiefly the complementary air. Decrease or disappearance of the reserve air after a deep inspiration is not a constant finding in all cases of pulmonary emphysema. It is probable that the respiratory dead space in emphysema is not significantly altered. The degree of respiratory disability has been found to be closely correlated with the ratio, residual air divided by total capacity and multiplied by 100. The higher this ratio the more pronounced the failure of respiratory adaptation to physical activity.—*Studies of Total Pulmonary Capacity and its Subdivisions. VI. Observation on Cases of Obstructive Pulmonary Emphysema, A. Hurtado, N. L. Kaltreider, W. W. Fray, W. D. W. Brooks & W. S. McCann, J. Clin. Invest., November, 1934, xiii, 1027.*—(*G. L. L.*)

Bilateral Spontaneous Pneumothorax.—This is a case report of the occurrence of bilateral spontaneous pneumothorax in a woman. The collapse of the lungs was of the successive type. The right lung first collapsed. While following its progress by serial X-rays a complete collapse of the left lung was accidentally discovered. After four months of sanatorium residence the patient was discharged apparently in satisfactory condition. The day after her return home she developed acute dyspnoea and very great collapse and shortly afterwards died. The previous history suggested tuberculosis as the aetiological factor.—*Bilateral Spontaneous Pneumothorax with Report of a Case, S. R. Wilson, Lancet, July 21, 1934, ccxxvii, 136.*—(*B. T. McM.*)

Chronic Pulmonary Emphysema.—A study of 52 cases of emphysema and a corresponding number of normals indicates that other roentgenological evidence is much more important than rib position or width of the intercostal space in establishing a differential diagnosis in emphysema. Roentgenoscopic examination is important, first, in picking out constantly increased radiolucence which shows a decrease in the vital capacity, and, second, in showing no decrease in the transparency of the bases during expiration which means an increase in the residual air. Motility and low position of the diaphragm are less conclusive roentgenoscopic evidences of emphysema. Roentgenograms taken in the posteroanterior and left oblique positions make possible the calculation of an index. The transverse diameter of the chest in the posteroanterior film over the diameter of the oblique film gives an index of more than one in normal cases and below one in emphyse-

matous cases. Two diameter levels are usually calculated but the one at the base of the heart is more accurate than the one at the apex. Flaring of the lower ribs on expiration is quite diagnostic. Areas of increased translucence are diagnostic when found. When chronic passive congestion is an associated condition the picture is obscured, since there is more blood than normal instead of less, as is the case in uncomplicated emphysematous areas. This same combination of conditions makes the increase in parenchymal markings a less reliable sign. Sharply outlined lines which do not follow the main part of the bronchial tree and are not associated with increase in the hilum shadow are the findings in emphysema.—*The Roentgenologic Diagnosis of Chronic Pulmonary Emphysema, W. W. Fray, Am. J. Roentgenol. & Rad. Ther., July, 1934, xxxii, 11.*—(*E. M. J.*)

Empyema or Collapsed Lung?—That it is sometimes extremely difficult to differentiate between atelectasis and empyema in chronic lung disease is illustrated by the following cases: *1:* A recognized case of bronchiectasis developed fever, leucocytosis, dull pain over the left lung, suppressed breath-sounds and an opaque shadow below the first interspace on the left side. Thoracotomy was done after the diagnosis was changed to neglected empyema. Autopsy showed an adherent and solid lung containing greenish-black areas of softening and dilated bronchi containing pus. *2:* The case ran a clinical course characterized by febrile exacerbations and remissions. The physical and roentgen signs suggested pleurisy with effusion. The heart appeared displaced to the right; there was no pulsation of the aorta. During each exacerbation empyema and lung abscess were suspected. Thoracotomy gave negative results. Autopsy showed pericardial effusion and an aneurysm of the aorta causing atelectasis and bronchiectasis. *3:* A case of carcinoma of the bronchus produced a clinical picture so strongly suggestive of lung abscess or empyema that phrenicotomy and thorocoplasty were done. Autopsy showed the physical and roentgen findings due to atelectasis. Two diagnostic procedures of great help in these cases are (1) In apical lesions roentgenograms made in inspiration are compared with those made in deep expiration; and (2) in basal lesions roentgenograms in lateral recumbency on the better side are compared with those made in the erect posture. Shadows due to pleural effusion are unchanged while those due to atelectasis enlarge and become less dense on hyperventilation.—*Is It Empyema or Collapsed Lung?, E. Korol, Am. Jour. Roentgenol. & Rad. Ther., August, 1934, xxxii, 198.*—(*E. M. J.*)

Diagnosis and Treatment of Bronchiectasis.—During the past decade much progress has been made in the diagnosis and treatment of bronchiectasis, due to advances in roentgenography, the use of lateral or profile films, investigation of the bronchial tree by means of an opaque medium, and the development of thoracic surgery with increased safety in the performance of lobectomy. It has been shown that the disease is much commoner than formerly realized. *Symptoms and diagnosis:* The onset is usually insidious, sometimes following an apparently simple acute bronchitis or an unresolved pneumonia. Cough and expectoration are the chief symptoms and may occur in cycles with relatively asymptomatic intervals. The sputum is mucopurulent and in about half the cases offensive, rather stale and musty than foul, as with abscess or gangrene. Haemoptysis occurs in about half the cases, the blood being either in streaks or profuse. In the purely bronchial forms, coarse, medium or fine nonconsonating râles may be the chief sign, which may disappear after the evacuation of secretions by cough. Persistent localization may suggest the site of the disease. In the cylindrical form roentgenography may show increased linear markings, and with the saccular form ring-shadows with or without a fluid level. The use of lipiodol serves to determine the lesions more accurately. In well-established cases the dangers are extension of infection, bronchopneumonia, abscess, gangrene, empyema, cerebral abscess, or meningitis. In a few cases fatal haemoptysis occurs. Confusion with tuberculosis is likely in some cases, especially with haemoptysis. Fourteen of 36 cases at the Massachusetts General Hospital were sent in by sanatoria. Haemoptysis had occurred in 12, in one initially, in a girl of 16. Later on there appeared an odorless, purulent sputum. Another case began with pains in the right costal region, for which the gall-bladder was explored, later came cough, haemoptysis and malodorous sputum. While acute lung abscess is unlikely to be confused, the more chronic types may be, also the two conditions may coëxist. Abscess has more often a history of onset following operation on the upper respiratory tract and a more offensive sputum. A single area of increased density, commonly located peripherally, with central radiance and fluid level, contrasts with the multiplicity and more central location of dilated bronchi. Lipiodol commonly fails to enter an abscess cavity but is usually visualized in bronchial dilations. The term

"dry bronchiectasis" is applied to cases with haemoptysis the chief symptom. Bronchoscopy is essential for determining the cause of bronchial obstruction and may help determine the source of blood or pus. Instillation of lipiodol into the trachea after evacuation by postural drainage, gives as satisfactory information as bronchoscopy, while postural drainage, in the absence of stenosis, is just as helpful in treatment. *Collapse and surgical therapy:* The pathological involvement limits the value of collapse therapy, — the difficulty of compressing the thickened bronchial walls and lumina and of obliterating the cavities, the frequent occurrence of adhesive pleurisy and persistence of the bronchial mucosa. However, in a fair number, improvement follows the use of artificial pneumothorax, but rarely permanent recovery, and there is danger of empyema from rupture of adhesions. Phrenic-nerve paralysis was also disappointing in all but 3 of 14 cases tried, or 5 out of 17, including 3 additional. Thoracoplasty was also unsatisfactory in all of 5 cases. Cure is to be expected in well-established cases only by removal of the dilated bronchi, as in lobectomy. Lilienthal was a pioneer in this field in 1922, followed by Graham, Whittemore, Brunn, Shenstone and Janes, Alexander, and Churchill. Prior to its consideration anteroposterior and lateral roentgenography is desirable without and with lipiodol but too exclusive reliance should not be placed on this in connection with extent of the lesions. Operation is contraindicated during an acute exacerbation or with poor general condition. Ballon, Singer and Graham in 1932 collected 212 cases of total or subtotal lobectomy with 72 operative deaths (34 per cent). Since then increasing experience and improved technic have diminished the hazard. At the Massachusetts General Hospital, 29 cases have undergone lobectomy. In the first ten (1921–1927) the operative mortality was 40 per cent, and in the last 19 (1929–1934) only 10.5 per cent. Of the 13 survivors of the second group, 10 were entirely relieved of cough and sputum; the others still have one-half to one ounce of non-foul sputum daily. It may thus be said that, while collapse therapy may lead to improvement, lobectomy offers the prospect of cure and should be advised in properly selected cases.—*Certain Aspects of Bronchiectasis with Special Reference to Diagnosis and Treatment, F. T. Lord, New England J. M., September 6, 1934, ccxi, 437.*—(*A. P.*)

Congenital (?) Bronchiectasis.—A milk roundsman, 18 years of age, seen at the Victoria Park Hospital, London, was admitted, complaining of cough and profuse foul sputum. His mother gave a history of his having some wheezy bronchitic symptoms first noticed at the age of fourteen months, but otherwise good health and function up to a month before admission when he noted chest pain and began to cough up purulent sputum. The patient was in poor general condition, underdeveloped and showed marked clubbing of fingers and toes. Dulness and loud bronchial breathing were present over the whole right side. The sputum soon became excessive. Roentgenographic examination showed in the right upper third numerous overlapping annular shadows, the lower two-thirds being clouded but showing similar, more obscure shadows. The left side was clear. Bacteriological examination of the sputum was unimportant. The patient, who was extremely ill, died some hours following a bronchoscopy. *Necropsy:* The right pleural cavity was obliterated but the adhesions seemed recent. The pleural surface was entirely devoid of pigment, which was abundant in the left. The right lung was airless and small, and felt cystic. It seemed to consist entirely of cavities full of pus, separated by large areas of density. The bronchi appeared normal except for inflammatory changes. The left lung showed hypertrophic emphysema and patches of pneumonia. The right posterior mediastinal lymph nodes were inflamed and also devoid of carbon. *Commentary:* The term congenital cystic disease has been applied to a variety of conditions in which a saccular state of the lung is assumed to have existed since birth. When the cysts are formed from dilated bronchioles the term congenital bronchiectasis is preferred. This was found to be the case here on microscopical examination. Both conditions are rare, and cases reported by Collins, Sydney Smith and Koontz are cited, all being infants. In the present case the absence of any history of preceding pulmonary inflammation is considered to favor a congenital process, as is the absence of pulmonary pigmentation.—*A Report on an Example of Congenital Bronchiectasis with the Results of Post Mortem and Pathological Investigation, W. B. Wood, Tubercle, November, 1934, xvi, 4.*—(*A. P.*)

Bronchography in Pulmonary Suppuration.—The changes in the roentgenological appearance of the bronchial tree depend on the stage of the suppurative bronchitis. In the preëxpulsive phase of the acute involvement bronchography generally reveals no changes from the normal except for the failure of alveolar dispersion due to the nonfilling of the alveoli with lipiodol. In the excretory phase the results of bronchography are different: the abscess cavity

is usually not filled, the bronchial tree presenting no changes from the normal. The same findings may also be present in cases without alveolar dispersion. But sometimes cylindrical dilatation or beading of the draining bronchi may be present. In chronic cases the abscess cavity is generally filled, and the surrounding bronchi show sacculated dilatation. The draining bronchi are of the type of cylindrical dilation and of beading appearance, which also may afflict the basal bronchi. In cases of nonvisualization of the cavity the differentiation between suppurative bronchiectases with cavitation and bronchiectases following lung abscess cannot be made.—*Serien-Bronchographie zur Diagnose der Lungeneiterungen, P. L. Farina, Röntgenpraxis, September, 1934, vi, 9.—(F. G. K.)*

Prognosis in Bronchiectasis.—In obstructive bronchiectasis the obstruction may be within or without the bronchi. If from within, the cause may be foreign body, stricture, benign or malignant tumor. If bronchiectasis is well established, removal of the cause may not cure it, but it may bring about marked improvement. Pressure from without may be caused by enlarged lymph nodes, malignant or otherwise, or by an aneurysm. The prognosis is usually grave due to the primary cause. In nonobstructive bronchiectasis the prognosis depends on the degree of advancement of the disease and the conditions, climatic and economic, under which the patient lives. Once the sputum becomes offensive the prognosis is grave. In suitable cases lobectomy should be curative and with improved technique in chest surgery it will be used more in the future.—*Prognosis of Bronchiectasis in Adolescents and Adults, F. G. Chandler, Lancet, October 27, 1934, ccxxvii, 943.—(B. T. McM.)*

Bronchial Spirochaetosis.—When Castellani in 1906 published his first paper on two natives of Ceylon suffering from chronic haemorrhagic bronchitis, he left the question open as to whether the spirochaetes in their sputum were causative agents of their disease, assuming that they might have been aspirated from the gums into the lower respiratory tract. Few writers who have contributed to the subject in the last twenty years seem to have been aware of how slight a foundation the present concept of bronchial spirochaetosis has. The diagnosis at present stands in favor in Egypt, other warm countries, and in France. Zimmerli, however, has repeatedly noted the finding of spirochaetes in the sputum of cases of heart disease in Egypt, this laboratory finding appearing sufficient evidence to the physician who thereby frequently missed other important findings. It now seems time to reconsider in detail on what facts this concept of bronchial spirochaetosis has been based. *Bacteriology:* Castellani apparently did not originally hold the idea of a specific infection, but in 1909 he adopted the name *Spirocheta bronchialis*, of which he believes there are different varieties. He later refers to Fantham, who worked in Khartoum in 1913–1914, and in 1915 concluded that "Spirochaete bronchialis is a species distinct. . . . differs from them (mouth spirochaetes) in morphology, pathogenicity and in staining reactions." He states that bronchial spirochaetes, as a rule, stain with difficulty although Castellani had originally reported that his organisms stained well by the Leishman method. It appears from Fantham's descriptions that *S. bronchialis* varies from 5 to 27μ in length and is of practically any shape. The assumption of a mixture of organisms seems most probable, especially after studying Fantham's drawings. Fantham also confuses his organisms with the Vincent's group in a still vaguer way. A later author, D. T. Smith, attempts classifications which conflict with Fantham's descriptions. It thus appears that no classification of oral spirochaetes is feasible until they are differentiated by cultural and animal experiments and no description yet given will enable one to recognize a spirochaete under the microscope as *S. bronchialis*. In the Official History of the War Medical Service a paper by Semple and collaborators on gingivitis and Vincent's angina records an investigation of 512 healthy soldiers of all ages, in 95 per cent of whose gums spirochaetes were found present. Also, Zimmerli has found them in the sputum of 71 out of 106 cases of pulmonary tuberculosis, mostly advanced, and these were of great variety. Their number varies greatly even in the same case. It is a common fallacy to think that a patient can eliminate oral spirochaetes by rinsing the mouth or gargling. Gargles have no effect behind the palatoglossal arch (pons) nor does either rinsing or gargling empty the interdental spaces. It is noted that pyorrhoea is common among the Egyptian population and that with marked pyorrhoea the number of spirochaetes increases, yet even a mouth free from pyorrhoea may contain spirochaetes. In 1925 Bezançon and Etchegoin published a paper in which they stated that among 140 cases of pulmonary tuberculosis all the haemorrhagic sputa contained spirochaetes and none of the others. They believed they had discovered a special type, which D. T. Smith rejects. There are a number of sources of error, pointed out by Zimmerli, who concludes that on the non-

haemorrhagic specimens the spirochaetes were very likely washed off, and also that the French authors may have mistaken artefacts in the blood for spirochaetes. *Pathology:* Half a year after Castellani's first publication of 1906 Branch reported an autopsy of a West Indian negro with severe haemorrhage and advanced pulmonary tuberculosis whose sputum contained both masses of spirochaetes and tubercle bacilli, and who died ten days after the haemoptysis but showed no spirochaetes in the pulmonary lesions or the small bronchi. It seems clear, despite Branch's contrary opinion, that they must have been derived from the mouth. Pons published a similar case in 1924 in a French Annamite soldier who died of aortic regurgitation. Delamare has in his book on *Bronchial Spirochaetosis* remarked on the paucity of postmortem evidence and admits that "the original and uncomplicated bronchial spirochaetosis is totally unknown from an anatomical point of view." Castellani, in 1906, weakens in his belief of a specific organism, holding it probable that the "large number of spirochaetes in the sputum .... are .... the causative agents." In pulmonary disease spirochaetes were discovered by Leyden and Jaffe in 1867, and have been demonstrated in healthy lung tissue around a necrotic focus by a number of authors, including Fishberg and Kline. This invasion may be of a chronic nature similar to one type of pulmonary syphilis. Zimmerli has made postmortem investigations in 31 patients with phthisis in whose sputum spirochaetes were found. Eight were properly dissected and in 23 cases the chest-wall was punctured and secretions aspirated. Only once were spirochaetes found, this being within a giant cavity in a patient who had foetid sputum. *Animal experiments:* The experiments of Chalmers and O'Farrell, who worked with Fantham in Khartoum in 1913, are often cited, but neither their results nor their own conclusions warrant the deductions commonly drawn. In fact, their results in monkeys were entirely negative as regards transmissibility of "spirochetosis." *Clinical observations:* Castellani in 1906 described (1) chronic cough, (2) sputum, often haemorrhagic, with repeated hæmoptyses, and (3) coarse moist râles over the lower parts of both lungs. Later (1909) he divided the disease into acute and chronic forms. In 1926 he omitted the bloody sputum as an essential, and now practically all that remains is the presence of spirochaetes in the sputum, "after rinsing the mouth or gargling with sterile water." Among several hundred recorded cases there are few which suggest any foundation to the concept of a bronchitis due to spirochaetes. The more or less rapid recovery after treatment by salvarsan or tartar emetic might seem more than suggestive, but Castellani's chronic cases showed little effect, and those in which a good effect was recorded seemed much more like cases of pulmonary abscess or bronchiectasis. Mere disappearance of spirochaetes from the sputum does not prove them responsible for lower respiratory-tract disease. Zimmerli cites a case of his own, in an Egyptian female of 30, who twelve years before contracted an acute febrile illness and a few years later began spitting a little blood, the sputum containing spirochaetes. She had a very advanced pyorrhoea with bleeding soft gums. She also ran a slight fever and had a chronic pyelitis. It seems that her bloody sputum was from the inflamed gums, the product resembling descriptions of Castellani's "bronchite sanglante." Burket's recently reported case (in *Tubercle*) is by no means clear-cut. Thus, we have the clinician ultimately depending on a laboratory report which may be very misleading. Likewise, proof of supposed contagiousness of this indefinite malady is quite lacking. We find it now commonly stated that "bronchial spirochaetosis" is a widely distributed disease, though originally thought to be a tropical one, but Staehelin, of Basle, in 1930, could not get beyond a suspicion of one case. Galli-Valerio, of Lausanne, is sceptical of the relation of spirochaetes to the clinical symptomatology described. *Conclusions: 1: Spirochaete bronchialis* has never been established as a species of its own. *2:* Spirochaetes .... may be found in any sputum .... provided it is not washed after expectoration. In 30 out of 31 cases of pulmonary tuberculosis (it was) demonstrated postmortem that .... spirochaetes come from the mouth and are not found below the bifurcation. *3:* "Bronchial spirochaetosis" is not established as a disease *sui generis*. *4:* If a patient draws blood out of his gums, the product is sure to contain numerous spirochaetes. *5:* An appeal is made to our colleagues in Ceylon to state their experience on cases of chronic haemorrhagic bronchitis on that island. If common among the Cingalese, how is it characterized?—*The Problem of Bronchial Spirochaetosis, E. Zimmerli, Tubercle, August, 1934, xv, 481.*—(*A. P.*)

Cystic Disease of Lungs.—The author presents a study based on 16 cases of congenital cystic disease of the lung observed at the Mayo Clinic. This condition occurs much more frequently than has been suspected. In a general way, all cases fall into two groups: (1) those in which there are single or multiple large cysts containing air

or fluid, and (2) diffuse degeneration resulting in the so-called honeycombed type of lung. The congenital origin of this disease is still a matter of contention, but in many cases the lesions are palpably present at birth and in specimens obtained in later life pigment is absent almost invariably. With modern diagnostic methods, a roentgenological diagnosis should be made in a high percentage of cases. Secondary pulmonary infection is the greatest potential danger to which the patients are subjected. Patients who have no bronchial communication are safer, and the disease is less likely to progress than if such a communication exists. In cases in which there is a bronchial communication an attempt to produce complete bronchial occlusion is a proper procedure. Complete extirpation of fluid-containing cysts has given excellent results in a number of cases. A number of patients who had infected cysts, with bronchial communications, have been greatly benefited by bronchoscopic aspiration followed by injection of iodized poppy-seed oil. This treatment should be considered in cases of this sort. Diffuse, bilateral cystic degeneration of the so-called honeycomb type is not benefited by any form of treatment.—*Congenital Cystic Disease of the Lungs: A Clinical Study, H. G. Wood, Jour. Am. Med. Ass., September 15, 1934, ciii, 815.*—(*G. L. L.*)

Indurative and Destructive Processes in Mediastinal Lymph Nodes.—Tuberculous or anthracotic induration or liquefaction of mediastinal lymph nodes are not infrequent in the upper age-groups. They produce a great variety of clinical pictures, depending on the relation of the diseased lymph nodes to the neighboring organs. Fibrotic periadenitis may secondarily produce paralysis of the recurrent laryngeal nerve, disturbances of the vagus, diverticulum-formation of the oesophagus, and stenosis of the bronchi. Perforation of a lymph node, either tuberculous or anthracotic, or both, may produce recurrent pneumonia with abscess-formation. Such cases frequently make necessary the differential diagnosis between mediastinal lymphadenitis and bronchial carcinoma. The presence of a diverticulum of the oesophagus speaks in favor of a periadenitic process. Perforation of a lymph node may be indicated by anthracotic sputum, and bronchial carcinoma is likely to be associated with a higher sedimentation-rate than adenitis. Aspiration pneumonia, following bronchial perforation of lymph nodes, is characterized by an intermittent course. Since these lymphadenitic accidents occur almost exclusively during senility, an active therapy is usually out of the question.—*Indurative und Zerfallsvorgänge in den mediastinalen Lymphknoten im höheren Alter mit Schädigung der benachbarten Organe, A. Arnstein, Beitr. Klin. Tuberk., October, 1934, lxxxv, 343.*—(*M. P.*)

Thoracogenic Scoliosis.—To determine the mechanical factors, frequency, significance and prevention of thoracogenic curvatures 854 patients have been studied. Only rarely are curvatures so marked as to give symptoms or be of clinical significance. Rib, muscle or intrathoracic imbalance or their combinations result in deviations from the normal spine. Each pair of ribs grips the spine with definite force. Depending upon the number and length of the costal segments removed, the level of resections and proximity to the spine curvatures result from the push against the vertebrae by the unopposed ribs. These deviations appear immediately or within a few days after operation. Muscle imbalance, illustrated by spastic hemiplegia, forces the ribs downward, narrows the intercostal spaces, and arches the spine with the concavity toward the affected side. Intrathoracic imbalance is divided into 3 groups, pleural, intrapleural and pulmonary. Pleural imbalance, as illustrated by empyema, by its centripetal pull forces the ribs downward and creates a deviation with the convexity toward the healthy side. Intrapleural imbalance may force a deviation with the convexity toward the empyema side but a fixed mediastinum must be present. Intrapulmonary imbalance, depending upon mobility of the mediastinum, may cause deviations also. In 102 cases of acute empyema 44 showed some spinal deviation. Only 6 of these were classed as moderate and 38 of slight degree. From the group of 146 cases of chronic empyema (30 per cent tuberculous) 65.8 per cent developed curvatures. Two per cent of these were severe, 37 moderate, and 61 slight. In 180 cases of pulmonary tuberculosis without effusion and without surgical therapy, there were slight curvatures in 17.8 per cent. In 37 uncomplicated cases of bronchiectasis only 1 developed a slight curvature. The study of 131 patients with thoracoplasty showed all to be affected in some degree. After simple drainage of empyema cavities only 2 of 43 cases showed slight persistent curvature. From 50 cases after phrenicectomy there were no curvatures. Following lower lobectomy 9 of 11 cases developed curvature. This was severe in one, moderate in five and slight in three. Prevention of pleural scoliosis depends upon early closure of empyema and effusion cavities, by having patients lie on the affected side and by postural wedge compression. This wedge placed opposite or

slightly toward the apex of the curve will help control scoliosis after thoracoplasty. In established severe curvatures correction control may be obtained only by fusion of the entire curved spinal segment.—*Thoracogenic Scoliosis, J. D. Bisgard, Arch. Surg., September, 1934, xxix, 417.*—(*J. F. B.*)

Disability in Pulmonary Fibrosis.—The authors present a study of 53 cases of pulmonary fibrosis divided, since aetiological classification was impossible, into 6 groups depending on the anatomical type of fibrosis revealed in roentgenograms. An attempt was made to arrive at a reliable method of estimating the degree of respiratory disability in these cases. In addition to careful clinical, roentgenographic and electrocardiographic studies, the following observations were made: total pulmonary capacity and its partition between vital capacity and residual air, and the mid-capacity; the tidal air, dead space, alveolar gases, and the response of the pulmonary ventilation to exercise; clinical and chemical studies of the blood and of its gas content, particularly with reference to its saturation with oxygen. These studies indicate that a decrease in the total and vital capacities and an increase in the residual air are characteristic changes in these fibroses,—changes that tend to become more accentuated as the degree of fibrosis increases. The ratio of residual air to total pulmonary capacity is one of great functional significance; the higher the ratio the greater is the tendency to anoxaemia. Thus the saturation of the arterial blood with oxygen is less than the normal 94 per cent in every case in which the ratio exceeded 49 per cent, in all but one case in which it exceeded 45 per cent, and in all but 4 cases in which it exceeded 40 per cent. The Sturgis-Peabody formula for predicting maximum ventilatory capacity from the vital capacity is shown to be roughly correct when applied to cases of pulmonary fibrosis. Patients with pulmonary fibrosis attain maximum ventilation with less acceleration in rate of breathing than in the case of normal subjects or patients with heart disease or emphysema.—*The Estimation of Functional Disability in the Pulmonary Fibroses, W. S. McCann, A. Hurtado, N. Kaltreider & W. W. Fray, Jour. Am. Med. Ass., September 15, 1934, ciii, 810.*—(*G. L. L.*)

Roentgen Classification of Pneumonoconiosis.—Since the present classification of pneumonoconiosis does not lend itself as a guide in the estimation of incapacity, as an indicator for the discontinuance of certain occupations, nor help determine compensation obligations, a new one is presented with tables of roentgen findings in uncomplicated pneumonoconiosis, comparable types of tuberculosis and their combinations. In type 1 the hilar shadows are homogeneous and exaggerated with prominent trunk shadows. Childhood-type tuberculosis may be confused with it. Type 2a shows an enlarged hilum, trunk shadows and linear markings prominent, small discrete nodules, slight haze in the midlung fields, free diaphragm and possibly thickened interlobar pleura. This is comparable to miliary tuberculosis but there is no haze, and nodules are larger. Type 2b is similar except there are as yet no nodules. There is no typical tuberculous lesion comparable to this type. In type 3 all the above findings are increased, restricted diaphragmatic motion is found together with some peaking, and emphysema with widened intercostal spaces and increased size of lung fields appear. This is comparable to chronic fibroid tuberculosis. In type 4 emphysema is definitely present, the lung markings are largely obscured, and the diaphragm may be peaked or wavy. The other findings are more advanced. There is no tuberculous counterpart. Type 5a shows slowly progressive nodular predominance. These nodules are small, discrete, dense and uniform in both lung fields. Otherwise similar to type 2a. Type 5b is one of a rapidly progressive nodular predominance. The nodules are larger, dense, usually show early conglomerate appearance, especially in the upper two-thirds of the lung field, with emphysema in the lower one-third. Bronchopneumonic tuberculosis is comparable. Type 6 is one of advanced diffuse fibrosis. Type 6a is comparable also to bronchopneumonic tuberculosis and is a conglomerate nodular appearance, while type 6b is interstitial in appearance and is comparable to chronic fibroid tuberculosis. In type 6c there is a massive fibrotic appearance and may be compared with advanced fibroid tuberculosis.—*The Roentgen Classification of Pneumonoconiosis Based upon Roentgen Appearances with or without a Coexisting Tuberculous Process and the Differential Diagnosis, H. K. Pancoast & E. P. Pendergrass, J. Indust. Hygiene, November, 1934, xvi, 327.*—(*J. F. B.*)

Silicosis and Tuberculosis.—Under certain conditions it is apparently possible for silicosis to develop rapidly, within a period of eighteen months to four years, especially when the dust particles are exceedingly small and the concentration of dust is excessive, as, for example, in the process of sandblasting before the hazard of this occupation was recognized. So many fine particles are inhaled in such a short time that the lym-

phatic system is entirely inadequate to remove them. As a consequence, at the same time that nodules are developing in lymphoid tissues of the lung and mediastinum, similar lesions are forming everywhere in the walls of the air-spaces. The nodules are of microscopic size and there is an unusual amount of diffuse connective proliferation. The fineness of the silica renders it unusually toxic, and degenerative changes are prominent. Most patients with silicosis die of complicating tuberculosis, the source of which may be endogenous or exogenous. The clinical course of the infection is often atypical; it may not produce characteristic symptoms for a long time and can then only be diagnosed by the roentgenogram. Dusts containing silica are preëminently dangerous. Present knowledge will not permit it to be said that only free silica is harmful; possibly some of the silicates will also be incriminated. One silicate, asbestos, produces a characteristic and dangerous type of pulmonary fibrosis. Silica is a tissue poison. In low dilutions it causes nodular fibrosis; in higher concentrations it produces rapid necrosis of cells of all kinds. Silicosis specifically predisposes to infection with the tubercle bacillus. The mechanism of this action has not yet been determined. It probably consists in some alteration in the soil rather than in changes induced in the infecting organism. Nonsiliceous dusts localize about the lymphatic trunks and some of them excite the proliferation of small amounts of loose cellular connective tissue. They apparently do not increase susceptibility to tuberculosis. In combination with silica they modify the action of the latter, altering the anatomical characteristics of the lesions and apparently decreasing the susceptibility to tuberculosis.—*Inhaled Silica and its Effect on Norma, and Tuberculous Lungs, L. U. Gardnerl Jour. Am. Med. Ass., September 8, 1934, ciii, 743.*—(*G. L. L.*)

Activation of Silicosis by Acute Respiratory Infection.—It was formerly held that at least twelve to fifteen years of intensive exposure to granite dust were necessary to cause much permanent damage, but now it is known that certain individuals develop pathological changes as a result of much shorter exposures. It is also known that silicosis grows progressively worse under certain circumstances, and, although the average case changes but little if dust exposure is removed, certain dormant cases may develop active symptoms unexpectedly, especially following acute respiratory infections. Two such cases are cited in Russian Jewish workers of 47 and 58 years of age, who had been formerly employed in Russian pottery plants for ten to fifteen years, some thirty years before. Both complained of cough and dyspnoea, and one of weakness. Both presented bronchitic physical signs, and extensive mottling in the X-ray films, in one case fine, in the other coarser. The symptoms complained of were said to be very recent in each case, dating to supposed acute illnesses.—*The Effect of Acute Respiratory Tract Infections upon Latent Silicosis, J. B. Hawes, 2nd, & M. J. Stone, New England J. M., December 20, 1934, ccxi, 1147.*—(*A. P.*)

Silicosis in Potters.—Fifty-eight cases of silicosis are reported from the pottery industry, in which the concentration of dust is low. Silicosis develops slowly, while symptoms are latent and appear many years after physical and X-ray signs of silicosis are demonstrable. Tuberculosis was not observed clinically in the group studied.—*Silicosis. A Study of 106 Pottery Workers, P. A. Quaintance, Am. J. Pub. Health, December, 1934, xxiv, 1244.*—(*E. R. L.*)

Heart in Silicosis.—The patient suspected of silicosis should be examined by electrocardiographic methods. The electrocardiogram reveals in earlier stages of silicosis the increase of load in the lungs and functional changes of the right heart. There is generally a parallelism between the marked changes in the size of the cardiac stream curve and the degree of roentgenological anatomical findings of the lung. This can be of special value in cases of tuberculosis and silicosis, the presence of typical changes in the right heart action indicating primarily the prevalence of silicotic changes in the lung.—*Zur Beurteilung von Herz und Kreislauf bei Steinstaublungenkranken, G. Schlomka & L. Schulze, Klin. Wchnschr., August 24, 1934, xiii, 1208.*—(*F. G. K.*)

Silicosis and Silicotuberculosis Symptomatology.—This study was based upon the review of 59 cases of uncomplicated silicosis and 36 cases complicated with tuberculosis. Seventy-five per cent of the former were admitted to hospitals with no symptoms referable to the respiratory system and only 15 per cent of the remainder had chief complaints, such as cough, dyspnoea, asthma and chest pain. The blood-Wassermann reaction was negative in all cases and there were no unexplained anaemias. The majority of the cases of the slow interstitial type of silicosis had been coal-miners for more than 10 years, and showed emphysema and decreased diaphragmatic motion as their most prominent features, while cough and dyspnoea were prominent in the symptoms

of those men having early and slowly progressing interstitial changes in contrast to the group with nodular disease. In the group of 36 cases complicated by tuberculosis, only 11 had positive sputum. In this group respiratory symptoms, such as asthma, chest pains, weakness, haemoptysis, cough and dyspnoea were nearly three times as frequent as in the uncomplicated group. Most of the so-called asthmatics had massive consolidations. There was no relationship between the amount of disease in the lungs and the duration of occupation. In many cases a positive diagnosis of silicosis can only be made by a roentgen examination. It is not necessary for the sputum to be positive before a diagnosis of complicating tuberculosis can be made.—*A Clinical Study of Silicosis and Silicotuberculosis, the Diagnosis Based upon the Roentgen Classification, W. C. Hall, J. Indust. Hygiene, September, 1934, xvi, 300.*—(*J. F. B.*).

"Curious Bodies" in Lungs.—"Curious bodies," similar to those found in asbestosis, have been reported occurring in the lungs of coal-workers who had never worked in asbestos. In this study, portions of the lungs of 26 cases were digested with trypsin and the deposit examined microscopically. "Curious bodies" were found in 8 cases. They were found in lungs from 5 of 16 coal-miners, 2 of 7 coal-trimmers and 1 of 3 controls. From evidence collected in this investigation, it appears that gross pathological lesions of the lungs need not be present where "curious bodies" are found; hence it is difficult to ascribe any significance to their presence.—*"Curious Bodies" Found in the Lungs of Coal-Workers, E. Williams, Lancet, September 8, 1934, ccxxvii, 541.*—(*B. T. McM.*)

Pulmonary Asbestosis.—This is a review of 100 cases of pulmonary asbestosis. The cases are divided into four groups: *1: Pulmonary asbestosis:* There were 53 cases of this type with 12 deaths. The diagnosis rests upon (a) atypical appearances of the radiogram, (b) symptoms and physical signs of fibrosis, and (c) presence of asbestosis bodies in the sputum. *2: Pulmonary asbestosis with active tuberculosis:* Twenty-one cases, of which 11 were fatal. *3: Pulmonary asbestosis with obsolescent tuberculosis:* Nine cases. This group emphasizes the fact that tuberculosis is not necessarily activated by asbestosis. *4: Doubtful cases:* There were 17 such cases. All had suggestive symptoms, but the X-ray and sputum tests were not conclusive. The clinical picture of pulmonary asbestosis is that of fibrosis without excavation, and the outstanding symptom is dyspnoea. Diagnosis is made on the history, clinical picture, X-ray and sputum findings. The finding of asbestosis bodies in the sputum is not conclusive. The prognosis is not hopeless and the fibrosis is not always progressive. Septic bronchitis, bronchopneumonia and pulmonary tuberculosis are the commonest terminal complications of the disease. Whatever the added risk of tuberculosis may be in asbestosis, it is less than that associated with silicosis.—*Pulmonary Asbestosis. A Review of One Hundred Cases, W. B. Wood & S. R. Gloyne, Lancet, December 22, 1934, ccxxvii, 1383.*—(*B. T. McM.*).

Silicosis and Malignant Disease.—Three cases are reported of malignant disease in 14 postmortem examinations made upon persons suffering from silicosis in East Lancashire since 1930. It is suggested the material causing the silicosis may be an aetiological factor in the causation of the malignant disease. In 2 of the cases two independent malignant growths of different type were present. A case of myeloid leukaemia is also recorded occurring in a person suffering from silicosis since there are many reasons for regarding this disease as an example of malignant neoplasm.—*Silicosis and Malignant Disease, G. H. Dible, Lancet, November 3, 1934, ccxxvii, 982.*—(*B. T. McM.*)

Malignant Tumors of Lung.—The onset of malignant disease of the lung is insidious and often appears to arise in persons having chronic pulmonary disease, such as bronchitis or tuberculosis. A series of 73 cases is reviewed. Only 11 patients were below 40 years of age. In 33 the right side was affected and in 40 the left. The lower lobes were affected twice as frequently as the upper or middle lobes. Occupation appeared to have no aetiological importance. Cough was an invariable symptom, sputum of a definite amount was present in 64 per cent, haemoptysis occurred in 87.7 per cent, dyspnoea in 74 per cent and pain was experienced in 60 per cent of the cases. The clinical signs varied with the location of the growth. Roentgen-ray examination is essential for diagnosis and localization, and for information regarding the pleura and diaphragm. The bronchogram is also essential for evidence of bronchial obstruction and its location. Bronchoscopy may give valuable information regarding the direct vision of a tumor, or narrowing due to a submucous growth or from outside pressure and broadening of the carina from enlarged mediastinal lymph nodes. Other aids may be artificial pneumothorax, thoracoscopy, examination

of effusions and exploratory thoracotomy. Deep X-ray therapy in true pulmonary neoplasms has not been satisfactory. Radium, in the form of radon seeds in special containers which can be left in place for several days, was employed in 32 patients. The majority of the patients died of their growths, but most were much more comfortable, fever was reduced, wasting disappeared and the general malaise was lessened. In several the primary growths in the bronchi disappeared entirely. In 27 patients in whom no other procedure was feasible open thoracotomy with direct implantation of radon seeds was employed. Their average survival was 12 months compared with 4 or 5 months expected life. Many of these were relatively well for long periods, many were relieved of intolerable pain, three are living and symptomless, 20, 24 and 48 months later. Fourteen patients had their growth removed, of whom, one is living and well after 6 years, another after five and a half years, another 4 years and a fourth after 11 months. Two patients required total pneumonectomy. Both died of mediastinal involvement. Definite relief from symptoms and prolongation of life can be offered patients with malignant pulmonary disease. Cure can be affected in some.—*Malignant Disease of the Lungs, A. T. Edwards, J. Thorac. Surg., December, 1934, iv, 107.*—(*J. F. B.*)

Lymph-Node Metastasis in Pulmonary Tumors.—A tumor in an upper lobe which extends towards the surface of the lung and towards the apex produces the first clinically noticeable metastasis in the homolateral supraclavicular lymph nodes. If the tumor is situated near the hilum, the first metastasis is found on the opposite side. A pleural tumor produces the first metastasis in the homolateral axillary lymph nodes. Contralateral metastases are explained by the pressure of hilar tumors on the large lymph-vessels. Retrograde metastases are not infrequent. In most cases metastases occur within two months after the first symptoms. Their localization aids considerably in the localization of the primary tumor.—*Entstehung und klinische Bedeutung der tastbaren Lymph-knotenmestastasen bei Lungengeschwülsten, Beitr. Klin. Tuberk., December, 1934, lxxxv, 561.*—(*M. P.*)

Irradiation of Intrathoracic Malignant Tumors.—Chandler and Potter in 1927 published a follow-up of 59 such patients with discouraging results. One only had survived, and this patient had a huge mediastinal lymphosarcoma with bilateral pleural effusion and many large cervical lymph nodes—a young woman of 25 who was desperately ill but is now in excellent health with a normal skiagram. In the last few years the results have seemed to be much better; hence the present paper. *Diagnostic criteria:* These have included microscopical examination of sections of the growth or of metastases. The material was obtained by thoracotomy in seven cases, bronchoscopy in seven, removal of metastasis in five and postmortem material in nineteen. Clinical and radiological evidence is also considered. The material consisted of 70 cases from St. Bartholomew's Royal Chest Hospital and Victoria Park Hospital, as well as from private practice 1927–1933. A considerable number of physicians and surgeons contributed data. Bronchial carcinoma was most numerous, 56 cases, of whom 44 were treated by X-rays and 12 by radium. The mediastinal lymph nodes should always be treated as well as the tumor, and lymphosarcoma requires a smaller dose than carcinoma or endothelioma. *Treatment:* This is spread over two to five weeks and given five or six days a week. Various techniques have been used. In most cases the filtration has been about 0.5 mm. copper and 1 mm. aluminum, with 180 KV continuous tube current; later, a Thoraeus filter was used, equivalent to about 2.7 mm. copper, with 200 KV continuous current, and recently in private work up to 300 KV Villard circuit current with a filter of 0.6 mm. tin + 0.25 mm. copper + 1 mm. aluminum, equivalent to 4 mm. or more of copper. For a lymphosarcoma or other very sensitive tumor about 150 to 180 per cent of erythema dose is necessary, spread over two weeks, or more if over a longer period. With carcinoma about 250 to 300 per cent is given, spread over a month or six weeks. The erythema dose with 0.5 mm. copper and 180 KV is estimated at 650 roentgens, with 0.4 mm. and 300 KV at 1,000 roentgens. *Results:* Because of the occurrence of spontaneous remissions evaluation is difficult. Of 44 cases of bronchial carcinoma treated by X-rays, 23 were markedly improved. In 10 relief from pressure symptoms was rapid and dramatic, and in 11 more gradual; in the other 2 the X-ray shadow disappeared without corresponding clinical improvement. Complete reëxpansion of a collapsed lung occurred in 2 cases. At present, 5 patients are known to be living, at periods of five to thirty-two months; 18 are known to have died, with an average survival of 9.7 months, but with only 3 living more than 15 months. Slight improvement and incomplete relief occurred in 7 cases, whose average duration of life was about the same as in the first group. There were 14 patients who showed no response, their average survival period being 5.4 months.

It therefore seems that X-ray treatment has no great effect, except in rare cases, in prolonging life, but it may relieve the most urgent and distressing symptoms in about two-thirds of the cases and also effect local disappearance of the tumor. In 10 cases radium or radon was introduced directly through a bronchoscope, and the average duration of life after operation was 2.4 months. These results are discouraging. Of 9 other patients with various types of intrathoracic tumor, 4 showed no effects from treatment; 2 with secondary hypernephroma had their haemoptysis controlled; 1 with secondary sarcoma (osteogenic) had relief of cough and diminution in size of tumor; while 2 patients, one with an infiltrating mediastinal sarcoma and one with a secondary thyroid epithelioma, are living 11 and 21 years after treatment, the mediastinal sarcoma having entirely disappeared, whereas the nodular metastases in the other have increased. *Conclusions:* Results of X-ray therapy have greatly improved, as shown with two complete and lasting cures in tumors not of bronchial origin. Relief can be expected in a substantial proportion of cases, but results cannot be assured and severe reactions may occur.—*Irradiation Treatment of Malignant Intrathoracic Tumours, F. G. Chandler, N. S. Finzi & J. Maxwell, Brit. M. J., October 20, 1934, no. 3,850, 714.*—(*A. P.*)

Superior Pulmonary Sulcus Tumor.—The author presents 2 case reports of a clinical entity of tumor characterized by pain, Horner's syndrome, bone destruction and atrophy of hand muscles, hitherto known by the name "superior pulmonary sulcus tumor." After examination of autopsy material from one of his cases the author is convinced that the tumor arose from the mucosa of the terminal bronchioles in the apex of the lung, and that the name "primary carcinoma of the pulmonary apex" might be appropriate, and further evidence supports the view that it is an atypical form of primary bronchogenic carcinoma. A modification of Coutard's method of intensive deep roentgen therapy failed to control the symptoms of the disease. Chordotomy should be considered as a valuable palliative procedure.—*Superior Pulmonary Sulcus Tumor: Further Observations, with Report of Two Additional Cases, H. W. Jacox, Jour. Am. Med. Ass., July 14, 1934, ciii, 84.*—(*G. L. L.*)

Cancer and Pulmonary Tuberculosis.—*Case Report:* In a man, 56 years old, ulcerative pulmonary tuberculosis and a primary pulmonary carcinoma were found at autopsy. The tumor was located in the right main bronchus and in old tuberculous cavities. Studies of the histological sections showed that the tumor originated from metaplastic bronchial epithelium and fungated into the cavities, but that there was no histogenetic relation between the tuberculous tissue and the epidermoid carcinoma.—*Untersuchungen über Carcinomentstehung in einer tuberkulösen Kaverne, C. Renner, Beitr. Klin. Tuberk., September, 1934, lxxxv, 231.*—(*M. P.*)

Bronchogenic Carcinoma with Pneumonoconiosis.—Carcinoma of the lung exists with pneumonoconiosis although the latter may not easily be recognized symptomatically. The association of the two conditions is important in that the question of the causation of the carcinoma by an existing pneumonoconiosis is raised. The low incidence of pulmonary tumors in the coalminers of Pennsylvania is probably no higher than that of the general population. Short summaries of two cases with carcinoma and pneumonoconiosis are given.—*Bronchiogenic Carcinoma Associated with Pneumonoconiosis: a Report of Two Cases, M. L. Allen, J. Indust. Hygiene, November, 1934, xvi, 346.*—(*J. F. B.*)

Laryngeal Carcinoma and Pneumonoconiosis.—From 117 cases of laryngeal carcinoma 6 were in miners. Five of these had definite pneumonoconiosis and all had worked in the mine at least 15 years. The existence of these two diseases together is probably coincidental.—*Report of Cases of Carcinoma of the Larynx in Pneumonoconiosis, J. H. Harris, J. Indust. Hygiene, November, 1934, xvi, 348.*—(*J. F. B.*)

Occurrence of Lymphogranulomatosis and Relationship to Tuberculosis.—During the period 1915–1931, 548 cases of lymphogranulomatosis, verified histologically, were found in Sweden. The average rate of incidence was 0.054 per 10,000, in contrast to 15.6 for tuberculosis. The geographical distribution of cases coincided with areas of denser population, and they were evenly distributed among rural and town populations. Social and hygienic conditions and contagion did not seem to be important factors. Lymphogranulomatosis occurred sparingly during the first two years of life and infrequently during childhood, but showed a marked increase immediately after puberty, reaching a maximum in females at 20–25 years, and in males at 60 years, with always a preponderance of males. The duration of the disease was less than 2 years in 60 per cent, and less than 4 years in 87 per cent of the cases. The coincidence of lymphogranulomatosis and tuber-

culosis, as to geographical distribution, family history, relative age incidence, clinical and postmortem cases, was not such as to suggest a connection between the two diseases. Lymphogranulomatosis seems to favor the occurrence of miliary tuberculosis. The tuberculin tests showed a large per cent of negative results in lymphogranulomatosis. The abdominal lymph nodes, especially the retroperitoneal group, and the left supraclavicular nodes were most commonly affected. The gastrointestinal mode of infection was therefore suggested. The lungs were affected in about one-third of the cases, most commonly with nodular lesions. Cavities and haemoptysis occurred, but no haemorrhagic diathesis. The gastrointestinal tract was infected in about one-third of the cases, and the spleen in two-thirds, but the peritoneum only rarely. In many cases the leucocytes were increased, especially in advanced cases; the neutrophiles were increased, the eosinophiles were normal or reduced, and anaemia was present. The sedimentation reaction was practically always raised, more often than in tuberculosis. The postmortem and clinical data are tabulated, and records of rare cases and living patients are given.—*On the Occurrence of Lymphogranulomatosis (Sternberg) in Sweden 1915–1931 and Some Considerations as to its Relation to Tuberculosis, M. Uddströmer., Acta Tuberc. Scandinav., Supplement I, 1934, 1–255.*—(*F. B. S.*)

Aetiology of Lymphoblastoma.—The aetiological factors responsible for Hodgkin's disease and lymphosarcoma are still as vague and uncertain as they have been for years. Extended observation of some 500 to 600 cases has led the author, a radiologist, to note certain features which, from the standpoint of aetiology, have struck him as inescapably significant. The factor immediately responsible for lymphoblastomic hyperplasia of the lymphoid structures seems to be chronic infection of any kind. This may be tuberculous, pyogenic or even syphilitic; in fact, the variety of infection is of little consequence, provided the infectious element has been present for a sufficiently long time. If the questioning is well done, and if the wording of the questions is adjusted to the intelligence and social status of the patient, evidence of chronic infection will be obtained in a large proportion of histories. Still more significant, the chronic infection invariably has affected a part of the body drained by the group of lymph nodes that first gave indications of lymphoblastomic hyperplasia. The practically constant association of infection and primary lymphadenopathy in the same region and on the same side of the body can hardly be regarded as a coincidence. But a definite and unquestionable history of chronic infection in a region drained by the nodes first affected with lymphoblastoma cannot always be obtained. In the majority of patients tuberculosis does not appear to play an etiological part. Even if the aetiological relationship of infection is undeniable, a predisposing factor also is required. This additional and essential element is probably to be found in a hereditary predisposition or tendency transmitted from generation to generation, of the lymphoid tissue to react in a certain way to various noxious influences. Evidence to substantiate this assumption is not lacking. The tendency to adenoid and tonsillar hyperplasia among the children of certain families is well known. Among patients suffering from lymphoblastoma it is not a rare experience to encounter the disease affecting two or more members of a family. In the author's experience of more than 500 cases, several patients told of brothers, sisters or other relatives who had succumbed to the same disease.—*The Etiology of Lymphoblastoma: Chairman's Address, Arthur U. Desjardins, Jour. Am. Med. Ass., October 6, 1934, ciii, 1033.*—(*G. L. L.*)

Erythema Nodosum.—Erythema nodosum developed in 10 patients suffering from a fully developed pulmonary phthisis and it cannot therefore be considered an initial symptom of tuberculosis. The histories and case-reports are given. Exogenous factors, such as superinfection with the tubercle bacillus, administration of sanocrysin, bromides, pneumothorax treatment, intercurrent infections such as tonsilitis, rheumatic and putrefactive infections, seem to be the cause of the erythemata. Endogenous factors, such as menstruation, may also play a rôle. A change in the allergic state of the organism is believed to be the cause of the erythema.—*Ten Cases of Erythema Nodosum Developing during the Course of Florid Pulmonary Phthisis, Gerda S. Schnohr, Acta Tuberc. Scandinav., Fasc. 3, 1934, viii, 173.*—(*F. B. S.*)

Prognosis of Pulmonary Tuberculosis with Cavity.—The prognosis of a cavity must be considered in relation to the entire disease. There is evidence that natural healing of cavities is much commoner in the early stages. Especially is this true of annular shadows unaccompanied by physical signs of cavity, as illustrated in Jacquerod's monograph. The probability of the healing of thick-walled cavities depends on the ability of the lung to contract, and the proc-

ess is slow. As would be expected, the immediate mortality is lower in radiological than in clinical cavities. Von Düring traced 271 out of 651 cavity cases with relatively good prognosis, discharged from Gorchersdorf Sanatorium, finding 43 per cent alive three to five years later, the results being much better in inverse ratio to the degree of involvement of the contralateral lung. *Situation of cavity:* Stivelman and Miller from a study of 1,048 patients found the prognosis of advanced pulmonary tuberculosis worse in the left lung than the right, and Fishberg states that a natural healing of cavities seldom occurs in the left lung. Clarke's series do not show any significant difference. They do show a worse prognosis for lower-lobe cavities, on the basis of a few figures corroborating Von Düring. *Dangers of cavitation:* Alexander has detailed four dangers, which Clarke discusses in turn: *1: Haemoptysis:* It is questionable whether haemoptysis is especially associated with cavity-formaton and Jacquerod has cited impressive figures to the contrary, 88 per cent of his stage-3 cases having no history of haemoptysis. Clarke's figures from the Forster Green Hospital, Belfast, Ireland, tend to support Jacquerod. *2: Aspiration of infectious material:* Landreth and Morlock have shown, among others, the frequency with which contralateral infection is associated with cavitation, and also the rapidity. Also, less than 20 per cent of Von Düring's selected cavity group were unilateral. *3: Metastases:* There is much evidence to show that extrapulmonary complications are commoner in cavity cases, especially tuberculosis of the larynx, as Gravesen and the Matsons have well shown. Also, Wheeler found at Forster Green Hospital, Belfast, that 96 per cent of those with tuberculous and probably tuberculous laryngeal complications had bacillary sputum and 83 per cent demonstrable cavitation by X-ray. *4: Pleural adhesions:* Pleural adhesions tend to prevent healing of cavities, not only by artificial pneumothorax (60 per cent of cases) but by natural processes (Mille). *Mortality in cases with cavitation:* It is certainly a mistake to regard a cavity as an expression of resistance. The very high mortality of persistently sputum-positive cases (Watt, Macnalty, Fowler, Bardswell, Gillespie and others) is cited. Most of such cases have demonstrable cavities. Also, about 95 per cent of far-advanced cases studied by Bardswell and Clarke were dead after four to five years—mostly under conservative treatment. In pneumothorax cases Peter Edwards and others have shown a great difference in results according to whether cavities remained open. Clarke has studied the results after three to seven years in 379 sputum-positive patients at Forster Green Hospital, Belfast. Of those with clinical signs of cavity 30 per cent were living; with X-ray indications only 43 per cent, and with no cavity, 54 per cent. If all cases are considered the differences are greater. *Results of treatment by collapse therapy:* The prognosis of patients with cavity is notably improved by successful collapse therapy. Likewise the complication of laryngeal tuberculosis is benefited, as shown by St. Clair Thomson. Heise studied 80 Trudeau Sanatorium patients with X-ray evidence of cavity, mostly moderately advanced, and observed spontaneous healing in 21 per cent (in a later series, 46 per cent). Of 38 in whom the cavity persisted, 79 per cent showed disappearance of cavity when treated by pneumothorax. Presumably many of the cavities were small. These studies all show the necessity of rewriting the chapters on prognosis of cavity in our textbooks when the results of modern treatment have been more completely assessed.—*The Prognosis of Pulmonary Tuberculosis Complicated by Cavitation, B. R. Clarke, Tubercle, September, 1934, xv, 34.*—(*A. P.*)

Note: The Editor calls attention to and regrets the occurrence in two instances of the inclusion of two abstracts, each by a different abstractor, of the same paper. The instances in question are as follows:

1: Abstract headed *Leucocytes and Activity in Pulmonary Tuberculosis*, page 47, by abstractor *A. P.*, is of the same paper as abstract headed *Leucocytes in Tuberculosis*, page 50, by abstractor *R. C. S.*

2: Abstract headed *Schilling Differential and Red-Cell Sedimentation as Indices of Tuberculous Activity*, page 47, by abstractor *A. P.*, is of the same paper as abstract headed *Schilling Differential Count and Red-Cell Sedimentation*, page 51, by abstractor *R. C. S.*

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Facilitate Accurate Diagnosis with LIPIODOL (*LAFAY*)

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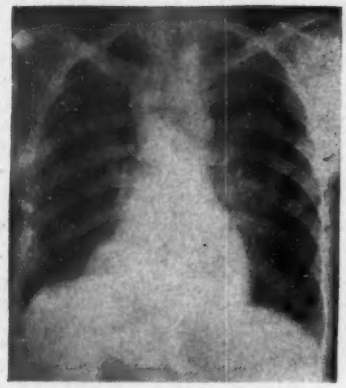

At left—PLAIN ROENTGENOGRAM

At right—LIPIODOL BRONCHOGRAM

Photographs courtesy of B. P. Potter, Hudson County Tuberculosis Hospital, Secaucus, N. J.

The modern roentgenologist employs a dye with which to visualize the gall bladder. . . . . A complete urologic study involves the use of an opaque medium either for retrograde or intravenous pyelography.

In the same way, Lipiodol—an iodized oil—has become an essential in the roentgenographic exploration of various body cavities and organs.

Lipiodol makes possible the radiologic examination of such organs which, otherwise, are not practically amenable to such examination. As for instance . . . in visualizing bronchial dilatations or in uterosalpingography.

Lipiodol, when indicated, enhances the diagnostic possibilities and criteria, where radiologic examination without it yields uncertainties and unsatisfactory results.

INDICATIONS FOR LIPIODOL:

Lipiodol may be advantageously used in the roentgenographic exploration of the following systems with, of course, proper consideration of suitable technique and contraindications in each case:

1. Broncho-pulmonary apparatus
2. Uterus and Fallopian tubes
3. Paranasal sinuses
4. Bladder, urethra and seminal vesicles
5. Lacrimal ducts
6. Fistulae and abscess cavities

Lipiodol (Lafay) is the original French iodized oil. It represents an organic stable combination of 40% iodine with poppy-seed oil. Lipiodol produces clean-cut, precise shadows which facilitate accurate diagnosis and therefore more efficient treatment.

Literature on request

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GENUINE

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